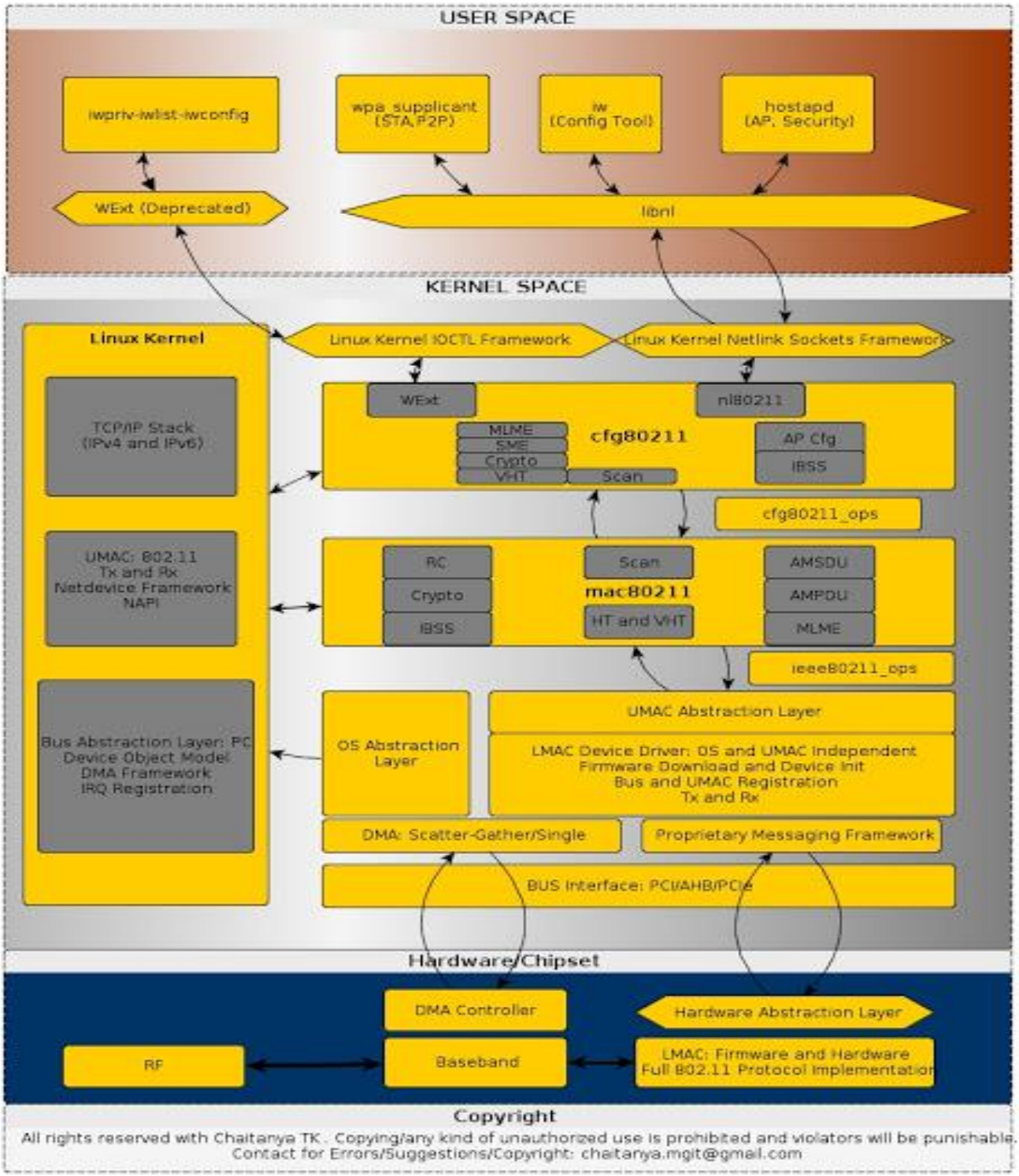
## Linux Wireless Driver Architecture





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## Wireless Terminology:

### BSS

*BSS* stands for *Basic Service Set*. The coverage of an access point is called a *BSS*.

### cfg80211

Kernel side of configuration management for wireless devices. Works together with FullMAC, mac80211, and nl80211.

### CLI

*CLI* stands for *Command Line Interface*. These are utilities you can run in the console or terminal emulator.

### FullMAC

*FullMAC* is a term used to describe a type of wireless card where the MLME is managed in hardware. You would **not** use mac80211 to write a *FullMAC* wireless driver.

### git-describe

git-describe is a git command. It outputs something like this:

*master-2013-07-03*

The first part is the *tag* for the current release. The second part is the number of patches which have been applied since the tag was applied. The last part, after the first *g* is the SHA1 commit ID of the last commit applied.

### IBSS

*IBSS* stands for *Independent Basic Service Set*. Its basically Ad-Hoc mode. See

http://en.wikipedia.org/wiki/Independent_Basic_Service_Set

### Information Element

An Information Element (IE) is a part of management frames in the IEEE 802.11 wireless LAN protocol. IEs are a device's way to transfer descriptive information about itself inside management frames. There are usually several IEs inside each such frame, and each is built of Type-length-value (TLVs).

The common structure of an IE is as follows:

```
 ←  1  →' ←  1   →' ←     1-255     →'
+-------+--------+-----------------+
| Type  | Length |     Data        |
+-------+--------+-----------------+
```

Whereas the vendor specific IE looks like this:

```
 ←  1  →' ←  1   →' ←        4        →' ←  1-251   →'
+-------+--------+-------------------+------------+
|  221  | Length |        OUI        |     Data   |
+-------+--------+-------------------+------------+
```

## iw

iw is a new nl80211 based CLI configuration utility for wireless devices.

## nl80211

User-space side of configuration management for wireless devices. It is a Netlink-based user-space protocol. Several user-space applications are available which utilize *nl80211*. See Developer Docs for nl80211.

## WNIC

The Wireless Network Interface Controller always refers to the hardware performing the functionality described in the standards family, i.e. IEEE 802.11. This can be

->an entire PCB (e.g. a mini PCIe wireless card),
->a single Chip or
->the functionality can even be integrated into a SoC.

## mac80211

A driver API for SoftMAC WNICs. See Developer Docs for mac80211.

See also SoftMAC.

## M A C

A WNIC works on both, Layer 1 and Layer 2 of the OSI model. MAC is a sub-layer for Layer2. http://en.wikipedia.org/wiki/Media_Access_Control.

## S o f t M A C

*SoftMAC* is a term used to describe a type of WNIC where the MLME is expected to be managed in software. mac80211 is a driver API for SoftMAC WNIC, for example.

## P H Y

A WNIC works on both, Layer 1 and Layer 2 of the OSI model. **PHY** is abbreviation for *physical-layer controller* and refers to the hardware components of the WNIC, that are responsible for creating/producing the em waves conforming to the standards specified in the responsible standard, e.g. IEEE 802.11a

See also Physical_layer.

## M L M E ( *Media Access Control (MAC) SubLayer Management Entity*.)

*MLME* Stands for *Media Access Control (MAC) Sublayer Management Entity*. MLME is the management entity where the Physical layer (PHY) MAC state machines reside. Examples of states a MLME may assist in reaching:

- Authenticate
- Deauthenticate
- Associate
- Disassociate
- Reassociate
- Beacon
- Probe
- Timing Synchronization Function (TSF)

mac80211's MLME management implementation is currently handled by `net/mac80211/ieee80211_sta.c`. This handles only the STA MLME

## S S I D

*SSID* stands for *Service Set IDentifier*. The SSID is a code attached to all packets on a wireless network to identify each packet as part of that network. The code consists of a string of 1-32 octets (usually represented as case sensitive alphanumeric characters).

http://en.wikipedia.org/wiki/SSID

### Station (STA)

*Station* (or *STA*) is the generic term for a device with a radio that can communicate with other *stations* in a wireless network. Common forms of a *station* are access points (AP), computers, or phones.

http://en.wikipedia.org/wiki/Station_(networking)

### WE

*WE* stands for Wireless-Extensions - the old driver API and user <"> kernel communication transport.

### WIPHY

Wireless PHY.

# *Wireless LAN and Linux Together*

With the advent of opensource the development time has come down hugely and the quality has improved quickly. For all those involved with WLAN/Wi-Fi and Opensource lets take a look at the wlan architecture in linux based on opensource mac80211 framework.

Block diagram explaining linux WLAN architecture. Please see above for details.

## USER-SPACE:

**Configuration: wpa_supplicant and hostapd:**

All the applications which interact directly with the user lie here. They can a GUI/CLI based ones for e.g. network manager in ubuntu/fedora distributions are UI based ones, but the core part are the CLI based ones eg. wpa_supplicant for controlling the STA part of it and hostapd for controlling the AP part.

Both are configuration file based along with their cli versions (wpa_cli, hostapd_cli) to send commands on the fly.

They support different features like SME, MLME, Security, Wifi-Direct (P2P), AP and STA configurations.

**Tools:**
We also have tools to send commands to the driver directly to set some parameters such as channel, bandwidth, some custom commands etc.

## THE BRIDGE: USER AND KERNEL

Now how the various applications in userspace communicate to the core entities in the kernel? Well, we have different approaches but all are based on different socket interfaces.

1. WExt ==> Generic Wireless Extensions: IOCTL Interface
2. NL80211==> Netlink Sockets
3. HostAP,==> Raw Packet Sockets
4. Chipset specific:

- Atheros==> IOCTL Interface
- Prism,IPW etc.

## KERNEL SPACE

### Configuration and UMAC

For opensource world the framework in kernel for WLAN is mac80211, it separates itself in to 2 kernel modules

- cfg80211.ko: Which handles all the configuration, user space interaction

- mac80211.ko: Protocol: Upper MAC , driver interaction.

Most of the features and management is handled by the mac80211 module with the help of lower MAC.

**Lower MAC Drivers**

Lowe MAC drivers act as a bridge between the UMAC and the chipset (Firmware and HW). They do all the device initialization, registration with OS, Bug Registration, Interrupts registration etc through the services provided by the linux kernel.

A well written driver follows these conventions

- Maintains a OS Independent Layer: Easy portability to different OSes.
- Maintains a UMAC Independent Layer: Easpy portability to different UMAC's: Proprietary, opensource, 3rd party etc.
- Bus Abstraction Layer: Maintains compatibility across different Physical Buses like PCI, PCIe, AHB, SDIO etc.

## CHIPSET: FIRMWARE AND HW

The full 802.11 protocol functionality is implemented here.

The firmware which probably runs on a separate processor/micro-controller configures and controls the hardware and also interacts with the host(The driver) through a messaging interface specific to the chipset (control path)

The Data path generally involves a DMA controller in the HW which takes care of generating interrupts to the host processor and transferring packets to and from the Host to the HW queues.

## REFERENCES:


1. wpa_supplicant_hostapd_devel_doc
2. For details on these click userspace_configurations.
3. wpa_supplicant

# Developers' documentation for wpa_supplicant and hostapd

The goal of this documentation and comments in the source code is to give enough information for other developers to understand

->how wpa_supplicant and hostapd have been implemented,
->how they can be modified,
->how new drivers can be supported, and
->how the source code can be ported to other operating systems.

If any information is missing, feel free to contact Jouni Malinen <j@w1.fi> for more information. Contributions as patch files are also very welcome at the same address. Please note that this software is licensed under the BSD license (the one with advertisement clause removed). All contributions to wpa_supplicant and hostapd are expected to use compatible licensing terms.

The source code and read-only access to the combined wpa_supplicant and hostapd Git repository is available from the project home page at http://w1.fi/wpa_supplicant/. This developers' documentation is also available as a PDF file from http://w1.fi/wpa_supplicant/wpa_supplicant-devel.pdf .

## %wpa_supplicant

wpa_supplicant is a WPA Supplicant for Linux, BSD and Windows with support for WPA and WPA2 (IEEE 802.11i / RSN). Supplicant is the IEEE 802.1X/WPA component that is used in the client stations. It implements key negotiation with a WPA Authenticator and it can optionally control roaming and IEEE 802.11 authentication/association of the wlan driver.

The design goal for wpa_supplicant was to use hardware, driver, and OS independent, portable C code for all WPA functionality. The source code is divided into separate C files as shown on the **code structure page**. All hardware/driver specific functionality is in separate files that implement a **well-defined driver API**. Information about porting to different target boards and operating systems is available on the **porting page**.

EAPOL (IEEE 802.1X) state machines are implemented as a separate module that interacts with **EAP peer implementation**. In addition to programs aimed at normal production use, wpa_supplicant source tree includes number of **testing and development tools** that make it easier to test the programs without having to setup a full test setup with wireless cards. These tools can also be used to implement automatic test suites.

wpa_supplicant implements a **control interface** that can be used by external programs to control the operations of the wpa_supplicant daemon and to get status information and event notifications. There is a small C library that provides helper functions to facilitate the use of the control interface. This library can also be used with C++.

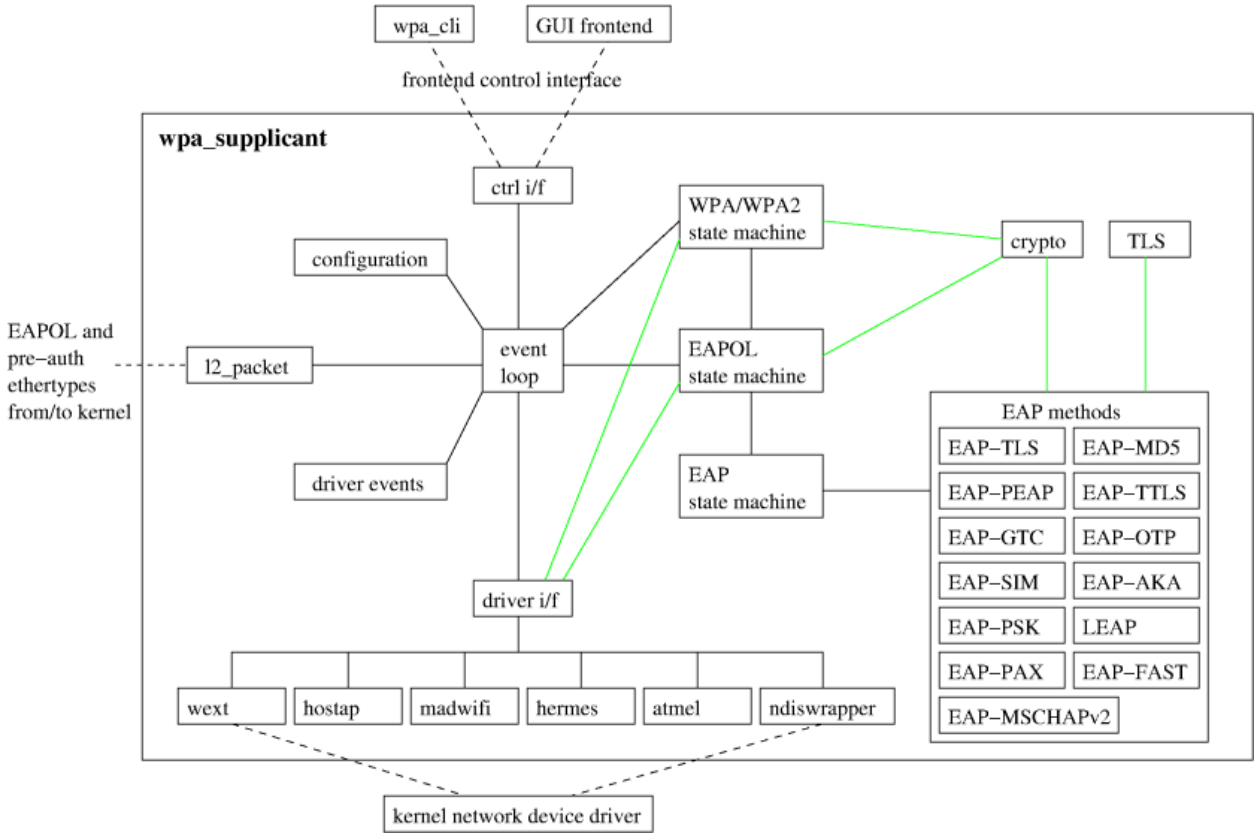


**Fig:wpa_supplicant modules**

## hostapd

hostapd includes IEEE 802.11 access point management (authentication / association), IEEE 802.1X/WPA/WPA2 Authenticator, EAP server, and RADIUS authentication server functionality. It can be build with various configuration option, e.g., a standalone AP management solution or a RADIUS authentication server with support for number of EAP methods.

The design goal for hostapd was to use hardware, driver, and OS independent, portable C code for all WPA functionality. The source code is divided into separate C files as shown on the **code structure page**. All hardware/driver specific functionality is in separate files that implement a **well-defined driver API**. Information about porting to different target boards and operating systems is available on the **porting page**.

EAPOL (IEEE 802.1X) state machines are implemented as a separate module that interacts with **EAP server implementation**. Similarly, RADIUS authentication server is in its own separate module. Both IEEE 802.1X and RADIUS authentication server can use EAP server functionality.

hostapd implements a **control interface** that can be used by external programs to control the operations of the hostapdt daemon and to get status information and event notifications. There is a small C library that provides helper functions to facilitate the use of the control interface. This library can also be used with C++.

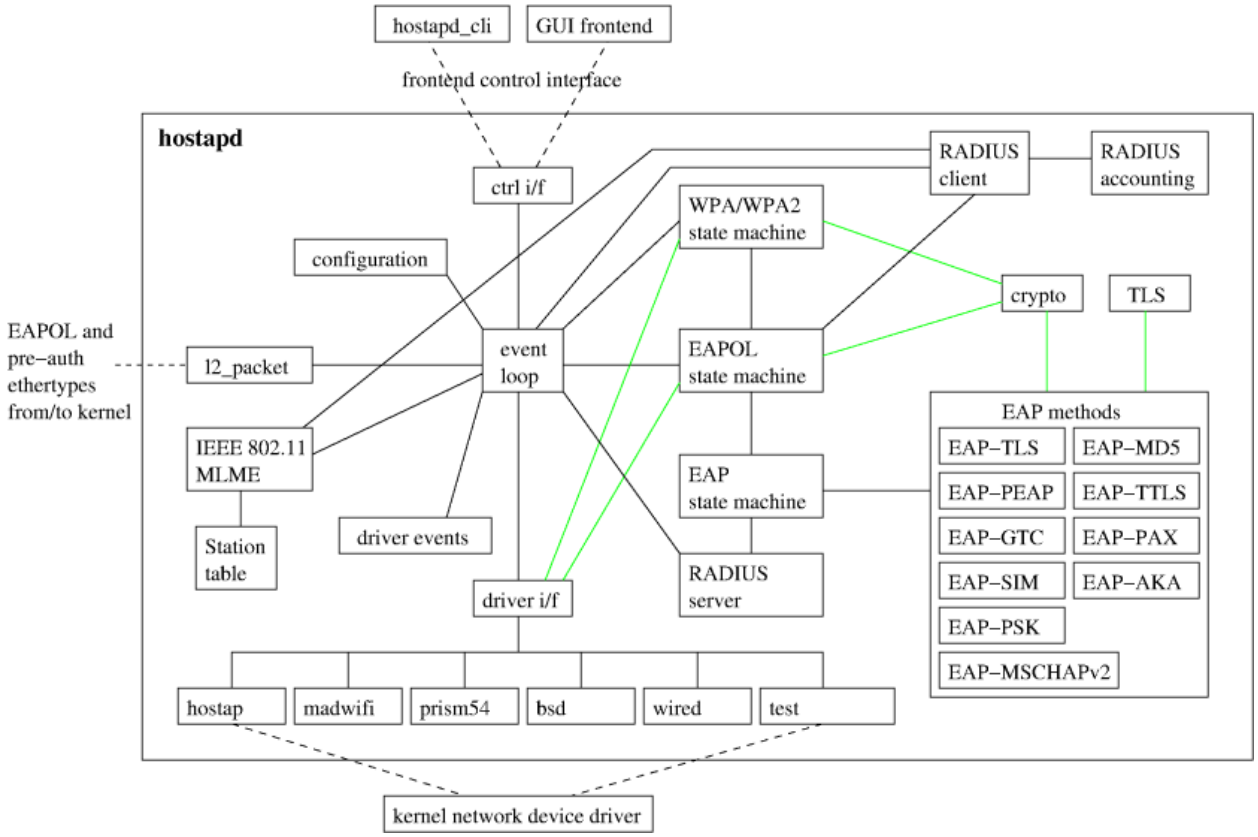


**Fig:hostapd modules**

# Mac80211 based open source architecture

(Redirected from MAC802.11 based Wilink)

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# mac80211 based WLAN driver: Description

Linux 2.6.39 RC1 kernel and up support WLAN in the 'station mode.' Soft access point (SoftAP) feature is going to be supported from Linux kernel 39 onwards. Alternatively, you can apply just the wireless patches to your present kernel. To do so, you can use compact wireless wl12xx.git to pull the SoftAP patches; and then apply them to your kernel code.

# Procedure to build WLAN and test on Ubuntu FS

## To enable WLAN on the Panda Board Linux Kernel (<= v3.4-rc7)

- Changes in the Linux Configuration for Kernel Building:

  Enable WLAN on Panda Board in the kernel configuration menu:

```
    Device Drivers  --->
        [*] Network device support  --->
            [*]   Wireless LAN  --->
                <M>   TI wl12xx driver support  --->
                    <M>   TI wl12xx support
                        <M>     TI wl12xx SDIO support
```

  Enable "nl80211 testmode command" in kernel configuration

```
    [*] Networking support  --->
       --- Wireless
             <M>   cfg80211 - wireless configuration API
                 [*]     nl80211 testmode command
```

  Build the uImage and modules and copy them to the Filesystem

```
    make ARCH=arm CROSS_COMPILE=arm-none-linux-gnueabi- uImage
    make ARCH=arm CROSS_COMPILE=arm-none-linux-gnueabi- modules
    make ARCH=arm CROSS_COMPILE=arm-none-linux-gnueabi-
INSTALL_MOD_PATH=<PATH_TO_FS> modules_install
```

## To enable WLAN on the Panda Board Linux Kernel (>= v3.5)

- Changes in the Linux Configuration for Kernel Building:

Enable WLAN on Panda Board in the kernel configuration menu:

```
Device Drivers  --->
    [*] Network device support  --->
        [*]   Wireless LAN  --->
            <M>   TI Wireless LAN support  --->
                <M>   TI wl12xx support
                {M}   TI wlcore support
                    <M>     TI wlcore SDIO support
```

Enable "nl80211 testmode command" in kernel configuration

```
[*] Networking support  --->
   --- Wireless
         <M>   cfg80211 - wireless configuration API
             [*]     nl80211 testmode command
```

## Firmware and NVS for the WLAN

- Clone the git tree : git.kernel.org/pub/scm/linux/kernel/git/dwmw2/linux-firmware.git

```
   git clone git://git.kernel.org/pub/scm/linux/kernel/git/dwmw2/linux-
firmware.git
```

- Copy the contents of "ti-connectivity" folder to /lib/firmware/ folder of the filesystem.

```
   Firmware and NVS for station:     wl1271-fw.bin  & wl1271-nvs.bin
   Firmware and NVS for SoftAP:    wl1271-fw-ap.bin & wl1271-nvs-ap.bin
```

## Testing WLAN in Station mode

TI WLAN interface name will show up as: "wlan0"

### [edit]To load WLAN modules

Check the list of modules loaded by using:

```
lsmod
```

The modules required are: wl12xx.ko and wl12xx_sdio.ko.

If they are not present, load them:

```
insmod /lib/modules/`uname -r`/kernel/net/wireless/cfg80211.ko
insmod /lib/modules/`uname -r`/kernel/net/mac80211/mac80211.ko
insmod /lib/modules/`uname -r`/kernel/drivers/net/wireless/wl12xx/wl12xx.ko
insmod /lib/modules/`uname -r`/kernel/drivers/net/wireless/wl12xx/wl12xx_sdio.ko
```

To verify the drivers loaded successfully:

```
tail -3 /var/log/kern.log
```

The expected (typical) output is:

```
cfg80211: Calling CRDA to update world regulatory domain
wl1271: loaded
wl1271: initialized
```

### To bring WLAN interface UP

To list all the interfaces that are up:

```
ifconfig
```

If the interface is not listed, check all the interfaces available:

```
ifconfig -a
```

Check whether wlan0 has a valid MAC address. If not assign it:

```
ifconfig wlan0 hw ether 00:22:33:44:55:66
```

Bring up the interface:

```
ifconfig wlan0 up
```

To verify the drivers loaded successfully:

```
tail -1 /var/log/kern.log
```

The expected (typical) output is:

```
wl1271: firmware booted (Rev 6.1.0.0.343)
```

## To Connect or Disconnect to an AP

Use "iwlist" or "iw" to scan.

```
iwlist wlan0 scan
     or
iw dev wlan0 scan
```

Connect to an AP listed in open mode:

```
iwconfig wlan0 essid "AP_NAME"
      or
iw wlan0 connect AP_NAME
```

If AP has the DHCP capability, get the IP address:

```
dhclient wlan0
   or assign it using:
ifconfig wlan0 xx.xx.xx.xx netmask 255.255.255.0
```

To disconnect from the AP:

```
iw dev wlan0 disconnect
```

## Testing WLAN in SoftAP mode

Install hostapd and udhcpd packages in the filesystem ,if they are not present.

```
To install hostapd and udhpcd:
    sudo apt-get install hostapd
    sudo apt-get install udhcpd
```

Download SoftAP.tar.gz to the Filesystem and untar it.

```
mkdir /SoftAP
cd /SoftAP
tar xvzf SoftAP.tar.gz
cp udhcpd.conf /etc/.
sudo chmod 755 ap.sh
```

To bring up WLAN in AP mode:

```
If it is in station mode, stop wpa_supplicant
./ap.sh sta_stop
Now start WLAN in SoftAP mode
./ap.sh ap
```

The expected (typical) output is:

```
Starting AP
Configuration file: /tmp/hostapd.ap.conf
Using interface wlan0 with hwaddr de:ad:be:ef:00:00 and ssid 'blazetest'
```

```
Could not set DTIM period for kernel driver
Starting DHCP server
AP start complete
```

To list all the stations connected to our SoftAP:

```
hostapd_cli all_sta
```

To stop WLAN in SoftAP mode:

```
./ap.sh ap_stop
```

**NOTE:** The default configuration of hostapd using the ap.sh is:

```
Interface: wlan0
BSSID : blazetest
Security : WPA2-AES
Password : password
Ip address: 10.0.0.1
```

## To change Security mode of SoftAP

Change the function **generate-hostapd()** in **ap.sh** file accordingly. Refer hospad.conf file for all parameters.

## To enable browsing on station when connected to SoftAP

*[edit]**Example Setup***

```
wlan                        device                      ethernet
-----------------------------------------------------------------------
-------
10.0.0.1                    Panda                        192.168.1.118
<===========> connected to your network 192.168.1.*
        /\                 (As Soft AP)
        ||
        ||
        ||
        ||
        \/
10.0.0.20                   Panda                            not used
                          (as Station)
```

```
--------------------------------------------------------------------------
```

***Modifications On Soft AP end:***

1.Before boot up of Panda used as SoftAP, uncomment **net.ipv4.ip_forward=1** in **/etc/systcl.conf** file

2.Start the wlan in SoftAP mode

3.Change wlan0 subnet mask form 255.0.0.0 to 255.255.255.0

```
ifconfig wlan0 netmask 255.255.255.0
```

4. Copy the following script as nat_start to the Filesystem and execute it.

```
echo "Stopping firewall and allowing everyone..."
iptables -F
iptables -X
iptables -t nat -F
iptables -t nat -X
iptables -t mangle -F
iptables -t mangle -X
iptables -P INPUT ACCEPT
iptables -P FORWARD ACCEPT
iptables -P OUTPUT ACCEPT
echo "Enabling SNAT (MASQUERADE) functionality on eth0"
iptables -t nat -A POSTROUTING -o eth0 -s 10.0.0.0/24 -j MASQUERADE
iptables -A FORWARD -s 10.0.0.0/8 -d 0/0 -j ACCEPT
```

```
chmod 755 nat_start
./nat_start
```

The expected (typical) output is:

```
Stopping firewall and allowing everyone...
Enabling SNAT (MASQUERADE) functionality on eth0
```

5. Now cross check whether SoftAP is able to browse a page or not

```
wget http://www.google.com
```

The example output is:

```
--2011-08-03 15:04:15--  http://www.google.com/
Resolving xyzproxy.com... 10.5.7.45
Connecting to xyzproxy.com|10.5.7.45|:80... connected.
Proxy request sent, awaiting response... 302 Found
Location: http://www.google.co.in/ [following]
--2011-08-03 15:04:15--  http://www.google.co.in/
Connecting to xyzproxy.ti.com|10.5.7.45|:80... connected.
Proxy request sent, awaiting response... 200 OK
Length: unspecified [text/html]
Saving to: `index.html'

    [ <=>                                   ] 10,735      --.-K/s   in
0.04s

2011-08-03 15:04:16 (297 KB/s) - `index.html' saved [10735]
```

***Modifications On Station end:***

1. Start wlan in Station mode and try to connect to the SoftAP.

NOTE: MAC address of wlan interface on Station and SoftAP must be different for successful connection

```
root@ubuntu-desktop:/mac802# ifconfig wlan0
wlan0     Link encap:Ethernet  HWaddr de:ad:be:ef:00:00
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:359 errors:0 dropped:0 overruns:0 frame:0
          TX packets:205 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:85062 (85.0 KB)  TX bytes:29082 (29.0 KB)
```

IF they are same change, change it on station using the following commands and then try to connect

```
service network-manager stop
killall wpa_supplicant
ifconfig wlan0 hw ether 00:22:33:44:55:66
wpa_supplicant -Dnl80211 -iwlan0 -C/var/run -u &
```

```
service network-manager start
```

2. After successful connection, Add a route so that everything is routed via wlan interface ( gateway = ip address of wlan interface on SoftAP end)

```
route add -net 0.0.0.0 netmask 0.0.0.0 gw 10.0.0.1
```

Check whether route is added or not

```
root@ubuntu-desktop:/mac802# route add -net 0.0.0.0 netmask 0.0.0.0 gw
10.0.0.1
root@ubuntu-desktop:/mac802# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use
Iface
10.0.0.0        *               255.255.255.0   U     0      0        0
wlan0
default         ubuntu-laptop.l 0.0.0.0         UG    0      0        0
wlan0

Check whether you can ping to Ethernet interface of SoftAP from Station
root@ubuntu-desktop:/mac802# ping 192.168.1.118
PING 192.168.1.118 (192.168.1.118) 56(84) bytes of data.
64 bytes from 192.168.1.118: icmp_req=1 ttl=64 time=17.7 ms
64 bytes from 192.168.1.118: icmp_req=2 ttl=64 time=12.5 ms
^C
--- 192.168.220.118 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 12.512/15.121/17.731/2.612 ms

Check whether you can ping to any other device of your network from
Station
root@ubuntu-desktop:/mac802# ping 192.168.1.184
PING 192.168.1.184 (192.168.1.184) 56(84) bytes of data.
64 bytes from 192.168.1.184: icmp_req=1 ttl=63 time=21.4 ms
64 bytes from 192.168.1.184: icmp_req=2 ttl=63 time=12.8 ms
^C
--- 192.168.220.184 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 12.878/17.165/21.453/4.289 ms
```

3. Now Copy **/etc/resolv.conf** of SoftAP to the station and we can download the webpage on Station also

4. Now cross check whether station is able to browse a page or not

```
wget http://www.google.com
```

The example output is:

```
--2011-08-03 15:04:16--  http://www.google.com/
Resolving xyzproxy.com... 10.5.7.45
Connecting to xyzproxy.com|10.5.7.45|:80... connected.
Proxy request sent, awaiting response... 302 Found
Location: http://www.google.co.in/ [following]
--2011-08-03 15:04:16--  http://www.google.co.in/
Connecting to xyzproxy.com|10.5.7.45|:80... connected.
Proxy request sent, awaiting response... 200 OK
Length: unspecified [text/html]
Saving to: `index.html'

    [ <=>                                   ] 10,735      --.-K/s   in
0.04s

2011-08-03 15:04:16 (297 KB/s) - `index.html' saved [10735]
```

# To connect to a secured AP use wpa_supplicant

1. First kill the supplicant if it is present:

```
sudo su
service network-manager stop
killall wpa_supplicant
```

2. Start with the following options:

```
wpa_supplicant -Dwext -iwlan0 -C/var/run -u &
```

or

```
wpa_supplicant -Dnl80211 -iwlan0 -C/var/run -u &
```

3. Use wpa_cli to connect to any network( open or secured)

```
wpa_cli -p/var/run
```

## No security (OPEN)

To connect to an AP without security:

```
add_network
set_network 0 ssid "name of AP"
set_network 0 key_mgmt NONE
enable_network 0
```

## With WEP security

To connect to an AP with WEP security:

```
add_network
set_network 0 ssid "name of AP"
set_network 0 key_mgmt NONE
set_network 0 wep_key0 <key>
enable_network 0
```

***NOTE: WEP key must be 10 or 26 characters long according to whether it is WEP40 or WEP128 respectively.***

## [edit]With WPA-TKIP security

To connect to an AP with WPA1 security:

```
add_network
set_network 0 ssid "name of AP"
set_network 0 key_mgmt WPA-PSK
set_network 0 pairwise TKIP
set_network 0 psk "key"
enable_network 0
```

## With WPA-AES-CCMP security

To connect to an AP with WPA2 security:

```
add_network
set_network 0 ssid "name of AP"
set_network 0 key_mgmt WPA-PSK
set_network 0 pairwise CCMP
set_network 0 psk "key"
enable_network 0
```

## With WPS security

### [edit]Push Button Method

To connect to an AP with WPS security using push button method:

**On the AP side:**

Press the push button

**On the Station side:**

```
wpa_cli -p/var/run
wps_pbc
```

Now the station connects to the AP automatically

### [edit]Pin Method

To connect to an AP with WPS security using pin method:

**On the Station side:**

```
wpa_cli -p/var/run
wps_pin any
49017007>
```

This will generate a pin.(Here it is 49017007)

**On the AP side:**

Enter the pin generated on the client side in the AP. Now the station connects to the AP automatically

## [edit]With 802.1x security

### [edit]Procedure to install the certificate

1. Copy the certificate to the filesystem.

2. Change user to root ( sudo su).

3. Change to the directory to which certificate was copied.

4. OPne the terminal and start openssl

```
 openssl
```

5. Type following commands to install CA certificate, client certificate and Private key.

```
pkcs12 -in certificate.pfx -out cacert.pem -cacerts –nokeys
pkcs12 -in certificate.pfx -out cert.pem -clcerts –nokeys
pkcs12 -in certificate.pfx -out key.pem –nocerts
```

6. For key.pem enter an 8-digit key when asked for pem pass phrase.

**NOTE 1:** Ensure that a valid certificate is provided to you from the administrator in pkcs12 format. **NOTE 2:** here certificate name is: certificate.pfx. Please change it accordingly **NOTE 3:**Enter the key provided by administrator when asked for Import key.

### [edit]Procedure to connect to the AP in 802.1x security:

#### *[edit]From GUI*

**EXAMPLE: EAP-TLS**

Click on AP that is secured with 802.1x EAP-TLS from nm-applet icon. Fill the following credentials in the popup window: **Authentication required for wireless network**

```
Authentication : Select PEAP or TLS
Identity : Provide as given by administrator
Client certificate : browse and select the cert.pem file
CA certificate : browse and select the cacert.pem file
Private key : browse and select the key.pem file
Private key password : 8-digit pem pass phrase entered while installing
key.pem
```

Click on Connect.

## Hidden Network

To connect to an AP in hidden mode (i.e. SSID not broadcasted):

Add the netwotk accordingly with the security.

Now set scan_ssid to 1 to that network_id using:

```
   set_network <network_id> scan_ssid 1
```

# Ad-Hoc:

## [edit]Using iw

Remove the current interface(i.e in Station (STA)infrastructure mode and add Ad-Hoc (IBSS) mode using iw as below

### [edit]open:

```
#iw dev wlan0 del
#iw phy phy0 interface add wlan0 type ibss
#ifconfig wlan0 up
#iw dev wlan0 scan
#iw dev wlan0 ibss join AdHocNetworkName 2412
```

To check the status

```
#iw dev wlan0 link
```

**NOTE:** If the scan results doesn't have an SSID="AdHocNetworkName", it will create the Ad-Hoc network with the same SSID.

We can join to it from other devices

## Using wpa_supplicant and wpa_cli

If you are using wpa_supplicant and wpa_cli, then please use the following commands:

### open:

```
add_network
set_network 0 ssid "adhoc-open"
set_network 0 mode 1
set_network 0 frequency 2412
set_network 0 key_mgmt NONE
enable_network 0
```

**WEP40:**

```
add_network
set_network 0 ssid "adhoc-wep40"
set_network 0 mode 1
set_network 0 frequency 2412
set_network 0 key_mgmt NONE
set_network 0 wep_key0 1234567890
enable_network 0
```

**WEP128:**

```
add_network
set_network 0 ssid "adhoc-wep128"
set_network 0 mode 1
set_network 0 frequency 2412
set_network 0 key_mgmt NONE
set_network 0 wep_key0 12345678901234567890123456
enable_network 0
```

## P2P

To establish P2P connection between two wlan devices which support P2P:

Start wlan on both devices. In the below example we are using two Panda boards( named as Panda A & Panda B).

Now on Panda A start p2p group in 2.412 GHz

```
wpa_cli  p2p_group_add  freq=2412
```

On Panda B try to connect

```
wpa_cli -iwlan0 p2p_find
wpa_cli -iwlan0 p2p_peers
wpa_cli p2p_connect <Panda A mac address> pbc join
```

On Panda A accept the request

```
wpa_cli  wps_pbc
```

Assign the IP address to the wlan interfaces on both boards to do any data transfer.

# Useful Links

**Mainline kernel:**

https://git.kernel.org/?p=linux/kernel/git/torvalds/linux-2.6.git;a=summary

git clone git://git.kernel.org/pub/scm/linux/kernel/git/torvalds/linux-2.6.git

**Luca kernel:**

https://git.kernel.org/?p=linux/kernel/git/luca/wl12xx.git;a=summary

git clone git://git.kernel.org/pub/scm/linux/kernel/git/luca/wl12xx.git

**Linux Firmware:**

https://git.kernel.org/?p=linux/kernel/git/dwmw2/linux-firmware.git;a=summary

git clone git://git.kernel.org/pub/scm/linux/kernel/git/dwmw2/linux-firmware.git

**Ti-Utils:**

https://github.com/gxk/ti-utils

git clone git://github.com/gxk/ti-utils.git

**iw tool:**

http://git.sipsolutions.net/?p=iw.git

git clone git://git.sipsolutions.net/iw.git

**latest wpa_supplicant & hostap:**

http://hostap.epitest.fi

git clone git://w1.fi/srv/git/hostap.git

# WPA supplicant

**wpa_supplicant** is a cross-platform **WPA Supplicant** with support for WPA and WPA2 (**IEEE 802.11i** / RSN (Robust Secure Network)). It is suitable for both desktop/laptop computers and embedded systems. `wpa_supplicant` is the IEEE 802.1X/WPA component that is used in the client stations. It implements key negotiation with a WPA Authenticator and it controls the roaming and IEEE 802.11 authentication/association of the wlan driver.

**Contents**

[hide]


- 1 Installation
- 2 Configuration
  - 2.1 Maintaining a custom configuration
- 3 Also See


## Installation

Install **`wpa_supplicant`** from the **official repositories**.

Optionally **`wpa_supplicant_gui`** can be installed which provides `wpa_gui`; a graphical frontend for `wpa_supplicant` using the **`qt4`** toolkit.

## Configuration

**`wpa_supplicant`** provides a reference configuration file located at `/etc/wpa_supplicant/wpa_supplicant.conf` which contains detailed documentation for the all available options and their utilisation.

In it's simplest form all the configuration file requires is a network block, for example:

```
/etc/wpa_supplicant/foobar.conf

network={
    ssid="..."
  }
```

This can easily be generated using the `wpa_passphrase` tool. For example:

```
$ wpa_passphrase foobarssid foobarspassword
network={
   ssid="foobarssid"
   #psk="foobarspassword"
```

```
   psk=f5d1c49e15e679bebe385c37648d4141bc5c9297796a8a185d7bc5ac62f954e3
}
```

Now both `wpa_supplicant` and `wpa_passphrase` can be combined to associate with almost all WPA2 (Personal) networks:

```
# wpa_supplicant -B -i [interface] -c <(wpa_passphrase [essid] [passphrase])
```

All that remains is to simply connect using a **static IP** or **DHCP**. For example:

```
# dhcpcd -A [interface]
```

## Maintaining a custom configuration

**Note:** Be advised that the recommended method for connection is using **Netctl** and is certainly better in the long term.

As discussed above we can make use of `wpa_passphrase` to generate a basic configuration which we can augment with additional networks and options of our choosing. This may be necessary for more advanced networks employing extensive use of **EAP**.

Firstly we will use `wpa_passphrase` to create our basic configuration file.

```
# wpa_passphrase foobarssid foobarspassword > /etc/wpa_supplicant/foobar.conf
```

**Tip:** Some unusually complex passphrases may require input from a file: `# wpa_passphrase foobarssid < passphrase.txt > /etc/wpa_supplicant/foobar.conf`

Next add a `ctrl_interface` so that we may control the `wpa_supplicant` daemon. We can allow `wpa_cli` to edit this configuration by setting `update_config=1`. We will also allow `wpa_supplicant` to initiate AP (Access Point) scanning and selection with `ap_scan=1`.

```
/etc/wpa_supplicant/foobar.conf

  ctrl_interface=DIR=/run/wpa_supplicant GROUP=wheel # allow control for
members in the 'wheel' group
  update_config=1
  ap_scan=1

  network={
```

```
    ssid="foobarssid"
    psk=f5d1c49e15e679bebe385c37648d4141bc5c9297796a8a185d7bc5ac62f954e3
}
```

Multiple network blocks may be appended to this configuration.

To start your network simply run the following:

```
# ip link set [interface] up
# wpa_supplicant -B -D nl80211 -i [interface] -c
/etc/wpa_supplicant/foobar.conf
# dhcpcd -A [interface]
```

**Note:** `nl80211` is preferred over the deprecated `wext` driver. For a list of supported drivers simply run `wpa_supplicant` without an argument.

For networks of varying complexity please study the examples provided in the default `/etc/wpa_supplicant/wpa_supplicant.conf` file.

## USB-WIFI Architecture In Embedded System :

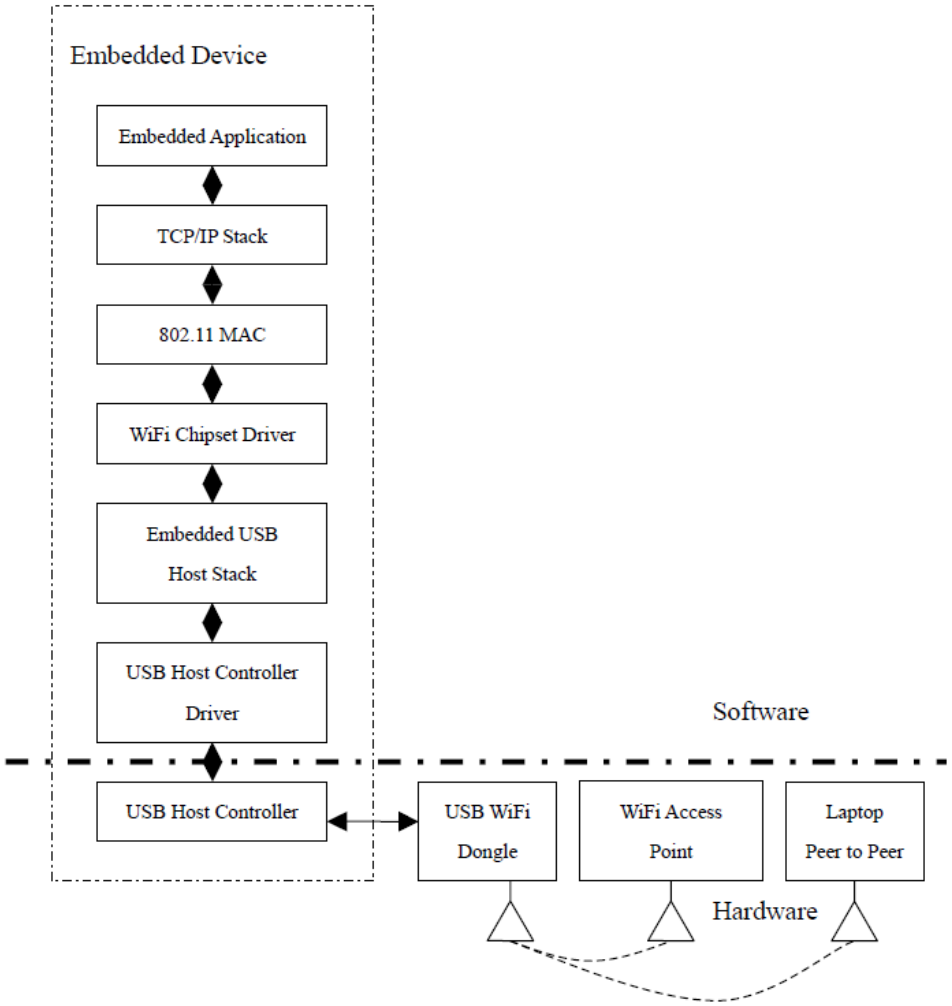


**Figure 9: USB to WiFi**

Wireless communication is becoming more and more popular. Several vendors are providing USB to WiFi (802.11) chipsets which enable systems having USB host ports to add wireless connectivity. These chipsets are commercially available in what are called “WiFi dongles” or “WiFi keys” and are generally inexpensive. Figure 9 shows the software needed in the embedded device. The 802.11 Media Access Controller provides an Ethernet-like interface to the local TCP/IP stack and controls the 802.11 controller in the WiFi chipset. The WiFi chipset driver controls the USB interface in the chipset. For security, 802.11 MAC also provides WEP (Wired Equivalency Privacy) or WPA (WiFi Protected Access).

Like the USB to Ethernet capability shown in Figure 8, this feature can be added to only some embedded units, as required. It is very useful in the field when a wired connection is not available or too expensive. Transfer rates of 200 KB/sec are typical for medium performance processors.

## Contents

1. Developer Documentation
2. Development basics
    1. Essential information on how to hack and contribute to Linux wireless

2. Other interesting information
3. Driver APIs
4. 802.11 Development process
5. Stable monitor list

## Developer Documentation

This section tries to organize documentation for new Linux wireless developers.

## Development basics

### Essential information on how to hack and contribute to Linux wireless

- MailingLists - Subscribe to our mailing lists
- Git-guide - learn to use git, emphasis on Linux wireless
- Using sparse - learn to use sparse
- IEEE-802.11 standards - standards we use and interpretations to help development
- SubmittingPatches - guide on how to submit patches for Linux wireless work
- Glossary - terms we use throughout the wiki you should be familiar with
- Maintainers - maintainers of current wireless drivers and driver APIs
- todo-list - Our current TODO list
- Firmware versioning - Suggested firmware versioning rules
- Linux Kernel Wireless (802.11) Implementation - some implementation details

### Other interesting information

- channel list
- information element order

MailingLists - Subscribe to our mailing lists
http://wireless.kernel.org/en/developers/MailingLists

**Contents**

1. About the Linux wireless mailing list
2. linux-wireless online archives
3. Stats and requirements of linux-wireless mailing list
4. Subscribing to linux-wireless
5. Unsubscribing from linux-wireless
6. Additional mailing lists
7. Submitting patches to linux-wireless

## About the Linux wireless mailing list

The *linux-wireless* was introduced in February of 2007 due to the fact that it was difficult to keep track of wireless-specific only related e-mails on *netdev*. We now use *linux-wireless* for **all** wireless development discussions, including to post patches. We now **only** post to *netdev* if patches or suggested changes touch generic networking code. If you are interested in sending patches please read our Submitting Patchesguide.

## linux-wireless online archives

If you don't want to subscribe or if you just want to refer to e-mail through a URL you have a few options, here are a few of them:

- gmane linux-wireless archive (threaded display)
- gmane linux-wireless archive (forum/blog-style display)
- marc archive on linux-wireless

## Stats and requirements of linux-wireless mailing list

This mailing list is specific to wireless development. The list address is *linux-wireless@vger.kernel.org* .**No subscription is required for posting**.

The list currently sees about a thousand emails per month.

## Subscribing to linux-wireless

To subscribe, send an an e-mail to *majordomo@vger.kernel.org* with anything on the subject, but on the body put:

```
subscribe linux-wireless
```

## Unsubscribing from linux-wireless

To unsubscribe, send an an e-mail to *majordomo@vger.kernel.org* with anything on the subject, but on the body put:

```
unsubscribe linux-wireless
```

### Additional mailing lists

Each driver *may* have its own specific mailing list. If you want to help hack on a driver please subscribe to that driver's respective mailing list. Additionally general Linux network development has its own mailing list,*netdev@vger.kernel.org* . No subscription is required for posting to this mailing list. You can subscribe to this mailing list if you'd like to review general networking patches and work but please note that it is of considerably higher traffic than linux-wireless.

To subscribe to netdev send an an e-mail to *majordomo@vger.kernel.org* with anything on the subject, but on the body put:

```
subscribe netdev
```

### Submitting patches to linux-wireless

If you would like to submit patches to linux-wireless please read our Submitting Patches guide.

Git-guide - learn to use git, emphasis on Linux wireless

**Contents**


1. Git guide for Linux wireless users and developers
2. Cloning latest wireless-testing
3. Get the latest updates
4. Review the changes last registered
5. To review changes made to wireless drivers
6. To review changes made to mac80211
7. Hacking on Linux wireless
8. Check available branches
9. Reviewing changes between commmits
10. Merging git branches
11. Checkout code as it was from specific commit
12. Delete branches
13. No need to download more kernel tarballs
14. Generate patches
    1. Generating patches for renames
15. Fixing patches after review
    1. Fixing a patch or commit message
    2. Fixing a series of patches
        1. Annotating new revision
        2. Removing a commit from a series
        3. Adding a new commit to the series
16. Sending patches
    1. Setting up ssmtp
    2. Sending e-mails


## Git guide for Linux wireless users and developers

This is a quick git-guide for Linux users and developers with emphasis on Linux wireless. The latest Linux wireless development takes place on John Linville's wireless-testing git tree.

## Cloning latest wireless-testing

First, clone the wireless-testing.git tree

```
git clone
git://git.kernel.org/pub/scm/linux/kernel/git/linville/wireless-
testing.git
cd wireless-testing
```

## Get the latest updates

You will want to update your local git repository to match what John has last committed. You can do this as follows.

```
git pull
```

### Review the changes last registered

```
git log
```

### To review changes made to wireless drivers

```
git log -p drivers/net/wireless/
```

### To review changes made to mac80211

```
git log -p net/mac80211/
```

You get the idea.

### Hacking on Linux wireless

If you'd like to hack on Linux wireless you can create own branch based on the one you are using. This is so you don't screw your current branch up.

```
git checkout -b my-fix-for-foo
# hack hack hack
# To get a diff of your work:
git diff > my_changes.diff
# Or if you just want to read them:
git diff
# To revert to the original state of the branch:
git checkout -f
# If instead you want to commit
git commit -a
```

### Check available branches

Suppose you have created a few branches, and just are not sure what you have anymore.

```
# To view local branches
git branch -l
# To view all remote branches
```

```
git branch -r
```

### Reviewing changes between commmits

Suppose you want to get the log and diff between two commits.

```
# get the SHA of two commits
git log
# Then get the diff of them, by showing the logs in between
git log -p
d8a285c8f83f728be2d056e6d4b0909972789d51..9202ec15da36ca060722c363575e
0e390d85fb71
# Since SHAs are pretty unique you can just give it a short version
# and it will try to match what is right:
git log -p d8a28..9202e
```

### Merging git branches

Say you have two local branches, and I want to merge them. If you're on local branch *my-latest* and I want to merge with local branch *my-fix-for-foo*, you would do:

```
git pull . my-fix-for-foo
```

### Checkout code as it was from specific commit

Suppose you want to checkout what the codebase looked like at a specific commit SHA. You can do this with branches.

```
# Long form:
git checkout -b view-commit-foo
d8a285c8f83f728be2d056e6d4b0909972789d51
# Or short form:
git checkout -b view-commit-foo d8a28
```

### Delete branches

If you are fed up with a branch delete it. You must not be on that branch so go into another one.

```
git checkout master
git branch -D old-branch
```

### No need to download more kernel tarballs

You can simply make your current directory look like a specific tag blessed by Linus (or Linville).

```
git checkout -b v2.6.27-rc7 v2.6.27-rc7
```

### Generate patches

Say you have 3 commits and you want to send the patches now.

```
git format-patch --cover-letter -o some-dir
d8a285c8f83f728be2d056e6d4b0909972789d51..9202ec15da36ca060722c363575e
0e390d85fb71
# this is equivalent to, this is the short form
git format-patch --cover-letter -n -o some-dir d8a28..9202e
```

Where d8a28 was the last commit before you started hacking and 9202e is the current head, meaning the commit ID of your latest commit.

#### Generating patches for renames

If you are going to rename files you can add "-M" to the arguments to git-format-patch, this way the patches don't generate useless endless removals and adds for a simple rename.

### Fixing patches after review

This section tells you how to deal with fixing patches with git after you have sent them out for review or in case you realize you need to go back in history and edit/fix something.

#### Fixing a patch or commit message

To fix a patch or commit message you have committed you can simply do:

```
# Edit the file you forgot to add a fix for, and then
# tell git (-a option) all the files you have edited
# should go into the commit, but that you want it to apply
# to the last commit and you also want to review/edit the
# commit message
git commit -a --amend
```

If you want to ignore all changes you have pending don't use the "-a" option.

### Fixing a series of patches

When you a large set of patches and you are not the maintainer chances are pretty high you'll get feedback and you'll need to respin them. A nice trick to avoid having to use quilt/stgit/etc is to use git to edit the patch back in history and continue then. You can do this with git's rebase.

```
git rebase -i commit-id-foo
```

This will let you select which patches you want to edit, once done with editing you will have to add the file you fixed

```
git add drivers/net/wireless/foo/bar.c
```

And then amend the commit:

```
git commit --amend
```

You can skip the 'git add' part by just using 'git commit -a –amend' but keep in mind this will add into the commit *all* changes in your current diff (git diff).

If you didn't have to remove a commit, let the rebase continue.

```
git rebase --continue
```

Keep in mind you will have to edit the patches to deal with conflicts if any were found. To deal with them simply edit the files its complaining about, git add them, and do 'git rebase –continue' once done. The conflicts are marked with a set of "<<<<" in the sections. It'll have part from the original file and the part from the new file. You get to mangle with these to figure out what is the right code.

### Annotating new revision

If developers raise issues with your patch you are expected to follow up with another iteration of your patch or series of patches. In your new iteration of patches you should specify that these patches are part of a new iteration. You can do this by specifying the iteration number on the subject. For example, for a second iteration you would use:

```
[PATCH v2]
```

You can specify this with git by using an argument to git format-patch:

```
--subject-prefix="PATCH v2"
```

#### Removing a commit from a series

If you want to *remove* a commit you can do this trick:

```
git rebase -i commit-id-foo
git checkout commit-id-before-change
git rebase --continue
```

#### Adding a new commit to the series

If you want to add a new commit to the series simply add the commit using the usual commit procedures. Once you are done continue with the rebase.

### Sending patches

Read git-send-email man page. But here is a quick summary for those who just want to get it to work. Keep in mind git send-email is a perl script and is usually shipped separately from git core.

You can install your favorite mailer, one option is to use ssmtp.

#### Setting up ssmtp

Below is an example config that works with an exchange server, in etc/ssmtp/ssmtp.conf:

```
root=hacker@company.com
mailhub=smtp.company.com
hostname=smtp.company.com
FromLineOverride=YES

UseSTARTTLS=YES
AuthUser=hacker
AuthPass=my-uber-secret-password
```

Here is an example /etc/ssmtp/revaliases

```
user:hacker@company.com:smtp.company.com
hacker:hacker@company.com:smtp.company.com
```

user can be the username (`whoami`) on the system.

#### Sending e-mails

Once you have your mailer setup and patches in a directory, review them so they are correct. Once all done send them out using:

```
# Note new versions of git use: git send-email
git send-email --no-chain-reply-to --from "Random Developer
<hacker@company.com>" --to linville@tuxdriver.com --cc linux-
wireless@vger.kernel.org --cc maintainer-of-driver@some-cool.org some-
dir/
```

Where some-dir is where you stashed your patches. Keep in mind that if you are submitting a series it helps to send an introductory PATCH [0/n] as well, where n is the number of patches you want to send. You can add this to the git-send-email queue easily using –cover-letter when generating patches using git-format-patch. Be sure to edit the patch 0000-foo then. git-send-email will pick it up when you specify the directory

Using sparse - learn to use sparse

## Using sparse

Sparse is a semantic parser and static analyzer utility we use for Linux kernel development. We highly recommend to use spare for the wireless subsystem. Below are some quick instructions how to get this set up and how to use it.

**Contents**


1. Using sparse
2. Get sparse
3. Version of sparse to use
4. Install sparse
5. Using sparse
6. Endian checks


## Get sparse

You can get sparse from:

```
git://git.kernel.org/pub/scm/devel/sparse/sparse.git
```

## Version of sparse to use

We recommend to use the latest stable release of sparse. As of now this is v0.4.4, so you can do something as follows:

```
git checkout -b rel4 v0.4.4
```

### Install sparse

To install:

```
make
make install
```

### Using sparse

To use sparse for kernel development simply pass on the C=1 argument onto your make command. For example to enable sparse for mac80211 development you would use:

```
make C=1 M=net/mac80211/
```

### Endian checks

Endian checks are encouraged. Most endian complaints are typically valid and reflect design issues. These should be reviewed carefully. Some drivers force-enable endian checks with sparse by forcing it through their own driver makefiles upstream. If drivers do not have these you can enable sparse checks yourself by appending to your make command:

```
CF="-D__CHECK_ENDIAN__"
```

To enforce endian checks on your driver you can use something as follows on your driver Makefile:

```
ccflags-y += -D__CHECK_ENDIAN__
```

IEEE-802.11 standards - standards we use and interpretations to help development

## IEEE-802.11 Standards

Linux supports a variety of devices which were designed to support an array of IEEE-802.11 standards.

- Download some IEEE-802.11 standards for free: consists of standards after they have been published in PDF format after twelve months.
- Purchase new or draft IEEE-802.11 standards: draft standards or new standards

## Our own IEEE-802.11 interpretations

Here we list a few of our 802.11 standards interpretations to help development. Please feel free to add new sections, interpretations or simply add links to help with development.

- Power Savings: IEEE-802.11 was designed with power saving in mind for stations. This section tries to summarize what the standard defines for all aspects of power saving. Its work in progress.
- 802.11n: This section tries to summarize crucial aspects of 802.11n for mac80211 development.
- 802.11s: This section tries to summarize 802.11s (in draft) for mac80211 development.

SubmittingPatches - guide on how to submit patches for Linux wireless work

## Existing Linux Wireless drivers

We currently have a fair number of working drivers that cover most of the available WNICs on the market. However, most don't implement all possible features and many have issues. Hardware by companies not providing complete specifications, free firmware and drivers can be more problematic to support. The switching of chipsets by manufacturers without changing model numbers also makes this list less useful to those purchasing new hardware. Except for a handful of WNICs with free software drivers and free firmware, like e.g. the Penguin 802.11N, most available wireless hardware can not be exhausted when used with Linux. Below is an alphabetically sorted list of existent Linux drivers and their current capabilities.

See also:

- wireless drivers status
- wireless drivers capabilities
- **NOTE:** All drivers can of course run in station mode, but only a few drivers support the other available**wireless modes**! Support of cfg80211 also offers benefits.

| **Driver** | **Manufacturer** | **cfg80211** | **AP** | **IBSS** | **mesh** | **monitor** | **PHY modes** | **Buses** |
|---|---|---|---|---|---|---|---|---|
| adm8211 | ADMtek/Infineon | yes | no | no | no | ? | B | PCI |
| airo | Aironet/Cisco | no | ? | ? | ? | ? | B | PCI / PCMCIA |
| ar5523 | Atheros | yes | no | no | no | yes | A(2)/B/G | USB |
| at76c50x-usb | Atmel | yes | no | no | no | no | B | USB |
| ath5k | Atheros | yes | yes | yes | yes | yes | A/B/G | PCI / PCI-E / PCMCIA |
| ath6kl | Atheros | yes | no | yes | no | no | A/B/G/N | SDIO |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ath9k | Atheros | yes | yes | yes | yes | yes | A/B/G/N | PCI / PCI-E / AHB / PCMCIA |
| ath9k_htc | Atheros | yes | yes | yes | no | yes | B/G/N | USB |
| ath10k | Atheros | ? | ? | ? | ? | ? | AC | N |
| atmel | Atmel | no | ? | ? | ? | ? | B | PCI / PCMCIA |
| b43 | Broadcom | yes | yes | yes | yes | yes | A(2)/B/G | SSB / PCI / PCI-E / PCMCIA |
| b43legacy | Broadcom | yes | yes | yes | yes | yes | A(2)/B/G | PCI / SSB |
| brcmfmac | Broadcom | yes | no | no | no | no | A(1)/B/G/N | USB / SDIO |
| brcmsmac | Broadcom | yes | yes | no | no | yes | A(1)/B/G/N | PCI / AXI |
| carl9170 | ZyDAS/Atheros | yes | yes | yes | yes | yes | A(1)/B/G/N | USB |
| cw1200 | ST-Ericsson | yes | ? | ? | ? | ? | A/B/G/N | SPI / SDIO |
| hostap | Intersil/Conexant | no | ? | ? | ? | ? | B | PCI / PCMCIA |
| ipw2100 | Intel | no | no | yes | no | no | B | PCI |
| ipw2200 | Intel | no | no (3) | yes | no | no | A/B/G | PCI |
| iwlegacy | Intel | yes | no | yes | no | no | A/B/G | PCI-E |
| iwlwifi | Intel | yes | yes (6) | yes | no | yes | A/B/G/N | PCI-E |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| libertas | Marvell | no | no | yes | yes (4) | no | B/G | USB / PCMCIA / SDIO / GSPI |
| libertas_tf | Marvell | yes | yes | no | yes | ? | B/G | USB |
| mac80211_hwsim | Jouni | yes | yes | yes | no | yes | A/B/G/N | NONE! |
| mwifiex | Marvell | yes | ? | ? | ? | ? | A/B/G/N | SDIO |
| mwl8k | Marvell | yes | yes | ? | ? | yes | A/B/G/N | PCI |
| orinoco | Agere/Intersil/Symbol | yes | no | yes | no | yes | B | PCI / PCMCIA / USB |
| p54pci | Intersil/Conexant | yes | yes | yes | yes | yes | A(1)/B/G | PCI / PCMCIA |
| p54spi | Conexant/ST-NXP | yes | yes | yes | yes | yes | A(1)/B/G | SPI |
| p54usb | Intersil/Conexant | yes | yes | yes | yes | yes | A(1)/B/G | USB |
| ** prism2_usb | Intersil/Conexant | no | ? | ? | ? | ? | B | USB |
| ** r8187se | Realtek | yes | no | no | no | ? | B/G | PCI-E |
| ** r8192e_pci | Realtek | no | ? | ? | ? | ? | B/G/N | PCI-E |
| ** r8192u_usb | Realtek | no | ? | ? | ? | ? | B/G/N | USB |
| ** r8712u | Realtek | no | ? | ? | ? | ? | B/G/N | USB |
| ray_cs | Raytheon | no | ? | ? | ? | ? | pre802.11 | PCMCIA |
| rndis_wlan | Broadcom | yes | no | yes | no | no | B/G | USB |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| rt61pci | Ralink | yes | yes | yes | no | yes | A(1)/B/G | PCI |
| rt73usb | Ralink | yes | yes | yes | no | yes | A(1)/B/G | USB |
| rt2400pci | Ralink | yes | yes | yes | no | yes | B | PCI |
| rt2500pci | Ralink | yes | yes | yes | no | yes | A(1)/B/G | PCI |
| rt2500usb | Ralink | yes | yes | yes | no | yes | A(1)/B/G | USB |
| rt2800pci | Ralink | yes | yes | ? | ? | yes | A(1)/B/G/N | PCI |
| rt2800usb | Ralink | yes | yes | yes | yes(5) | yes | A(1)/B/G/N | USB |
| rtl8180 | Realtek | yes | no | no | no | ? | B/G | PCI |
| rtl8187 | Realtek | yes | no | yes | no | yes | B/G | USB |
| rtl8188ee | Realtek | yes | ? | ? | ? | ? | B/G/N | PCI-E |
| rtl8192ce | Realtek | yes | ? | ? | ? | ? | B/G/N | PCI-E |
| rtl8192cu | Realtek | yes | ? | ? | ? | ? | B/G/N | USB |
| rtl8192de | Realtek | yes | ? | ? | ? | ? | B/G/N | PCI-E |
| rtl8192se | Realtek | yes | ? | ? | ? | ? | B/G/N | PCI-E |
| rtl8723ae | Realtek | yes | ? | ? | ? | ? | B/G/N | PCI-E |
| ** vt6655 | VIA | no | ? | ? | ? | ? | A/B/G | PCI |
| ** vt6656 | VIA | no | ? | ? | ? | ? | A/B/G | USB |
| wil6210 | Atheros | yes | yes | no | no | yes | AD | PCI-E |
| ** winbond | Winbond | yes | ? | ? | ? | ? | B | USB |
| wl1251 | Texas Instruments | yes | no | yes | ? | yes | B/G | SPI / SDIO |
| wl12xx | Texas Instruments | yes | yes | yes | no | no | A(1)/B/G/N | SPI / SDIO |
| wl18xx | Texas Instruments | yes | ? | ? | ? | ? | ? | ? |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| wl3501_cs | Z-Com | no | ? | ? | ? | ? | pre802.11 | PCMCIA |
| ** wlags49_h2 | Lucent/Agere | no | ? | ? | ? | ? | B/G | PCI / PCMCIA |
| zd1201 | ZyDAS/Atheros | no | ? | ? | ? | ? | B | USB |
| zd1211rw | ZyDAS/Atheros | yes | yes | yes | yes | yes | A(2)/B/G | USB |

- Note: ** **staging drivers**

## Out of the tree drivers(Unsupported)

| Driver | Manufacturer | cfg80211 | AP | IBSS | mesh | monitor | PHY modes | Buses |
|---|---|---|---|---|---|---|---|---|
| acx1xx | Texas Instruments | yes | ? | ? | no | ? | B | PCI / PCMCIA / USB |
| agnx | Airgo/Qualcom | yes | ? | ? | ? | ? | A/B/G | PCI |
| ar6k | Atheros | ? | ? | ? | ? | ? | B/G | ? |
| poldhu | NWN | no | ? | ? | ? | ? | B | PCMCIA |

Notes:

1. 802.11a capabilities depend on the actual radio chip used.
2. 802.11a devices exist, but currently can't be used with this driver, A/B/G devices will work in B/G mode only.
3. There is support with a special, out-of-tree driver and special firmware, see http://sf.net/projects/ipw2200-ap.
4. Slightly different mesh implementation than mac80211's, in firmware.

5. Tested with RT2870/RT3070 driver
6. Only some devices

### Abandoned/Deprecated Drivers(Unsupported)

| Driver | Manufacturer | cfg80211 | AP | ad-hoc | mesh | monitor | PHY modes | BUS | Replaced by |
|---|---|---|---|---|---|---|---|---|---|
| ar9170usb | ZyDAS/Atheros | yes | no | yes | no | yes | A(1)/B/G/N | USB | carl9170 |
| arlan | Aironet/Cisco | no | ? | ? | ? | ? | pre802.11 | ISA | - |
| at76_usb | Atmel | no | no | no | no | no | B | USB | at76c50x-usb |
| netwave_cs | Netwave/Xircom | no | ? | ? | ? | ? | pre802.11 | PCMCIA | - |
| otus | ZyDAS/Atheros | no | ? | no | no | no | A/B/G/N | USB | carl9170 |
| prism54 | Intersil/Conexant | no | ? | ? | ? | ? | A/B/G | PCI / PCMCIA | p54pci |
| stlc45xx | ST/Nokia | yes | no | no | no | no | B/G | SPI | p54spi |
| wavelan | Lucent | no | ? | ? | ? | ? | pre802.11 | ISA / PCMCIA | - |

Glossary - terms we use throughout the wiki you should be familiar with

Glossary

Terms we use throughout the wiki with which you should become familiar.

**Contents**


1. BSS
2. cfg80211
3. CLI
4. FullMAC
5. git-describe
6. IBSS
7. Information Element
8. iw
9. nl80211
10. mac80211
11. MAC

12. MLME
13. PHY
14. SoftMAC
15. SSID
16. Station (STA)
17. WE
18. WIPHY
19. WNIC

### B S S

*BSS* stands for *Basic Service Set*. The coverage of an access point is called a *BSS*.

### c f g 8 0 2 1 1

Kernel side of configuration management for wireless devices. Works together with FullMAC, mac80211, and nl80211.

### C L I

*CLI* stands for *Command Line Interface*. These are utilities you can run in the console or terminal emulator.

### F u l l M A C

*FullMAC* is a term used to describe a type of wireless card where the MLME is managed in hardware. You would **not** use mac80211 to write a *FullMAC* wireless driver.

### g i t - d e s c r i b e

git-describe is a git command. It outputs something like this:

*master-2013-07-03*

The first part is the *tag* for the current release. The second part is the number of patches which have been applied since the tag was applied. The last part, after the first *g* is the SHA1 commit ID of the last commit applied.

### I B S S

*IBSS* stands for *Independent Basic Service Set*. Its basically Ad-Hoc mode. See

http://en.wikipedia.org/wiki/Independent_Basic_Service_Set

### Information Element

An Information Element (IE) is a part of management frames in the IEEE 802.11 wireless LAN protocol. IEs are a device's way to transfer descriptive information about itself inside management frames. There are usually several IEs inside each such frame, and each is built of Type-length-value (TLVs).

The common structure of an IE is as follows:

```
 ←  1  →' ←  1   →' ←     1-255     →'
+-------+--------+-----------------+
| Type  | Length |     Data        |
+-------+--------+-----------------+
```

Whereas the vendor specific IE looks like this:

```
 ←  1  →' ←  1   →' ←        4        →' ←  1-251   →'
+-------+--------+------------------+------------+
|  221  | Length |        OUI       |     Data   |
+-------+--------+------------------+------------+
```

### iw

iw is a new nl80211 based CLI configuration utility for wireless devices.

### nl80211

User-space side of configuration management for wireless devices. It is a Netlink-based user-space protocol. Several user-space applications are available which utilize *nl80211*. See Developer Docs for nl80211.

### mac80211

A driver API for SoftMAC WNICs. See Developer Docs for mac80211.

See also SoftMAC.

### MAC

A WNIC works on both, Layer 1 and Layer 2 of the OSI model. MAC is a sub-layer for Layer2. http://en.wikipedia.org/wiki/Media_Access_Control

### M L M E

*MLME* Stands for *Media Access Control (MAC) Sublayer Management Entity*. MLME is the management entity where the Physical layer (PHY) MAC state machines reside. Examples of states a MLME may assist in reaching:

- Authenticate
- Deauthenticate
- Associate
- Disassociate
- Reassociate
- Beacon
- Probe
- Timing Synchronization Function (TSF)

mac80211's MLME management implementation is currently handled by `net/mac80211/ieee80211_sta.c`. This handles only the STA MLME

### P H Y

A WNIC works on both, Layer 1 and Layer 2 of the OSI model. **PHY** is abbreviation for *physical-layer controller* and refers to the hardware components of the WNIC, that are responsible for creating/producing the em waves conforming to the standards specified in the responsible standard, e.g. IEEE 802.11a

See also Physical_layer.

### S o f t M A C

*SoftMAC* is a term used to describe a type of WNIC where the MLME is expected to be managed in software. mac80211 is a driver API for SoftMAC WNIC, for example.

### S S I D

*SSID* stands for *Service Set IDentifier*. The SSID is a code attached to all packets on a wireless network to identify each packet as part of that network. The code consists of a string of 1-32 octets (usually represented as case sensitive alphanumeric characters).

http://en.wikipedia.org/wiki/SSID

### S t a t i o n ( S T A )

*Station* (or *STA*) is the generic term for a device with a radio that can communicate with other *stations* in a wireless network. Common forms of a *station* are access points (AP), computers, or phones.

http://en.wikipedia.org/wiki/Station_(networking)

### W E

*WE* stands for Wireless-Extensions - the old driver API and user <�"> kernel communication transport.

### W I P H Y

Wireless PHY.

### W N I C

The Wireless Network Interface Controller always refers to the hardware performing the functionality described in the standards family, i.e. IEEE 802.11. This can be an entire PCB (e.g. a mini PCIe wireless card), a single Chip or the functionality can even be integrated into a SoC.

Maintainers - maintainers of current wireless drivers and driver APIs

### m a i n t a i n e r  l i s t

The following list is generated automatically from the MAINTAINERS file based on the linux-wireless list.

```
        List of maintainers and how to submit kernel changes

Please try to follow the guidelines below.  This will make things
easier on the maintainers.  Not all of these guidelines matter for every
trivial patch so apply some common sense.

1.      Always _test_ your changes, however small, on at least 4 or
        5 people, preferably many more.

2.      Try to release a few ALPHA test versions to the net. Announce
        them onto the kernel channel and await results. This is especially
        important for device drivers, because often that's the only way
        you will find things like the fact version 3 firmware needs
        a magic fix you didn't know about, or some clown changed the
```

chips on a board and not its name.  (Don't laugh!  Look at the SMC etherpower for that.)

3. Make sure your changes compile correctly in multiple configurations. In particular check that changes work both as a module and built into the kernel.

4. When you are happy with a change make it generally available for testing and await feedback.

5. Make a patch available to the relevant maintainer in the list. Use 'diff -u' to make the patch easy to merge. Be prepared to get your changes sent back with seemingly silly requests about formatting and variable names.  These aren't as silly as they seem. One job the maintainers (and especially Linus) do is to keep things looking the same. Sometimes this means that the clever hack in your driver to get around a problem actually needs to become a generalized kernel feature ready for next time.

   PLEASE check your patch with the automated style checker (scripts/checkpatch.pl) to catch trival style violations. See Documentation/CodingStyle for guidance here.

   PLEASE CC: the maintainers and mailing lists that are generated by scripts/get_maintainer.pl.  The results returned by the script will be best if you have git installed and are making your changes in a branch derived from Linus' latest git tree. See Documentation/SubmittingPatches for details.

   PLEASE try to include any credit lines you want added with the patch. It avoids people being missed off by mistake and makes it easier to know who wants adding and who doesn't.

   PLEASE document known bugs. If it doesn't work for everything or does something very odd once a month document it.

   PLEASE remember that submissions must be made under the terms of the OSDL certificate of contribution and should include a Signed-off-by: line.  The current version of this "Developer's Certificate of Origin" (DCO) is listed in the file Documentation/SubmittingPatches.

6. Make sure you have the right to send any changes you make. If you do changes at work you may find your employer owns the patch not you.

7. When sending security related changes or reports to a maintainer please Cc: security@kernel.org, especially if the maintainer does not respond.

8. Happy hacking.

Descriptions of section entries:

   P: Person (obsolete)
   M: Mail patches to: FullName <address@domain>
   L: Mailing list that is relevant to this area

```
        W: Web-page with status/info
        Q: Patchwork web based patch tracking system site
        T: SCM tree type and location.  Type is one of: git, hg, quilt, stgit,
topgit.
        S: Status, one of the following:
           Supported:  Someone is actually paid to look after this.
           Maintained: Someone actually looks after it.
           Odd Fixes:  It has a maintainer but they don't have time to do
                       much other than throw the odd patch in. See below..
           Orphan:     No current maintainer [but maybe you could take the
                       role as you write your new code].
           Obsolete:   Old code. Something tagged obsolete generally means
                       it has been replaced by a better system and you
                       should be using that.
        F: Files and directories with wildcard patterns.
           A trailing slash includes all files and subdirectory files.
           F:   drivers/net/    all files in and below drivers/net
           F:   drivers/net/*   all files in drivers/net, but not below
           F:   */net/*         all files in "any top level directory"/net
           One pattern per line.  Multiple F: lines acceptable.
        N: Files and directories with regex patterns.
           N:   [^a-z]tegra    all files whose path contains the word tegra
           One pattern per line.  Multiple N: lines acceptable.
        X: Files and directories that are NOT maintained, same rules as F:
           Files exclusions are tested before file matches.
           Can be useful for excluding a specific subdirectory, for instance:
           F:   net/
           X:   net/ipv6/
           matches all files in and below net excluding net/ipv6/
        K: Keyword perl extended regex pattern to match content in a
           patch or file.  For instance:
           K: of_get_profile
              matches patches or files that contain "of_get_profile"
           K: \b(printk|pr_(info|err))\b
              matches patches or files that contain one or more of the words
              printk, pr_info or pr_err
           One regex pattern per line.  Multiple K: lines acceptable.

Note: For the hard of thinking, this list is meant to remain in alphabetical
order. If you could add yourselves to it in alphabetical order that would be
so much easier [Ed]

Maintainers List (try to look for most precise areas first)

                -----------------------------------

3C59X NETWORK DRIVER
M:      Steffen Klassert <klassert@mathematik.tu-chemnitz.de>
L:      netdev@vger.kernel.org
S:      Maintained
F:      Documentation/networking/vortex.txt
F:      drivers/net/ethernet/3com/3c59x.c

3CR990 NETWORK DRIVER
M:      David Dillow <dave@thedillows.org>
L:      netdev@vger.kernel.org
S:      Maintained
```

```
F:      drivers/net/ethernet/3com/typhoon*

3WARE SAS/SATA-RAID SCSI DRIVERS (3W-XXXX, 3W-9XXX, 3W-SAS)
M:      Adam Radford <linuxraid@lsi.com>
L:      linux-scsi@vger.kernel.org
W:      http://www.lsi.com
S:      Supported
F:      drivers/scsi/3w-*

53C700 AND 53C700-66 SCSI DRIVER
M:      "James E.J. Bottomley" <James.Bottomley@HansenPartnership.com>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/53c700*

6PACK NETWORK DRIVER FOR AX.25
M:      Andreas Koensgen <ajk@comnets.uni-bremen.de>
L:      linux-hams@vger.kernel.org
S:      Maintained
F:      drivers/net/hamradio/6pack.c

8169 10/100/1000 GIGABIT ETHERNET DRIVER
M:      Realtek linux nic maintainers <nic_swsd@realtek.com>
M:      Francois Romieu <romieu@fr.zoreil.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/realtek/r8169.c

8250/16?50 (AND CLONE UARTS) SERIAL DRIVER
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
L:      linux-serial@vger.kernel.org
W:      http://serial.sourceforge.net
S:      Maintained
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/gregkh/tty.git
F:      drivers/tty/serial/8250*
F:      include/linux/serial_8250.h

8390 NETWORK DRIVERS [WD80x3/SMC-ELITE, SMC-ULTRA, NE2000, 3C503, etc.]
L:      netdev@vger.kernel.org
S:      Orphan / Obsolete
F:      drivers/net/ethernet/8390/

9P FILE SYSTEM
M:      Eric Van Hensbergen <ericvh@gmail.com>
M:      Ron Minnich <rminnich@sandia.gov>
M:      Latchesar Ionkov <lucho@ionkov.net>
L:      v9fs-developer@lists.sourceforge.net
W:      http://swik.net/v9fs
Q:      http://patchwork.kernel.org/project/v9fs-devel/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/ericvh/v9fs.git
S:      Maintained
F:      Documentation/filesystems/9p.txt
F:      fs/9p/

A8293 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
```

```
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/dvb-frontends/a8293*

AACRAID SCSI RAID DRIVER
M:      Adaptec OEM Raid Solutions <aacraid@adaptec.com>
L:      linux-scsi@vger.kernel.org
W:      http://www.adaptec.com/
S:      Supported
F:      Documentation/scsi/aacraid.txt
F:      drivers/scsi/aacraid/

ABIT UGURU 1,2 HARDWARE MONITOR DRIVER
M:      Hans de Goede <hdegoede@redhat.com>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/abituguru.c

ABIT UGURU 3 HARDWARE MONITOR DRIVER
M:      Alistair John Strachan <alistair@devzero.co.uk>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/abituguru3.c

ACENIC DRIVER
M:      Jes Sorensen <jes@trained-monkey.org>
L:      linux-acenic@sunsite.dk
S:      Maintained
F:      drivers/net/ethernet/alteon/acenic*

ACER ASPIRE ONE TEMPERATURE AND FAN DRIVER
M:      Peter Feuerer <peter@piie.net>
L:      platform-driver-x86@vger.kernel.org
W:      http://piie.net/?section=acerhdf
S:      Maintained
F:      drivers/platform/x86/acerhdf.c

ACER WMI LAPTOP EXTRAS
M:      "Lee, Chun-Yi" <jlee@suse.com>
L:      platform-driver-x86@vger.kernel.org
S:      Maintained
F:      drivers/platform/x86/acer-wmi.c

ACPI
M:      Len Brown <lenb@kernel.org>
M:      Rafael J. Wysocki <rjw@sisk.pl>
L:      linux-acpi@vger.kernel.org
W:      http://www.lesswatts.org/projects/acpi/
Q:      http://patchwork.kernel.org/project/linux-acpi/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/lenb/linux
S:      Supported
F:      drivers/acpi/
F:      drivers/pnp/pnpacpi/
F:      include/linux/acpi.h
```

```
F:      include/acpi/

ACPI FAN DRIVER
M:      Zhang Rui <rui.zhang@intel.com>
L:      linux-acpi@vger.kernel.org
W:      http://www.lesswatts.org/projects/acpi/
S:      Supported
F:      drivers/acpi/fan.c

ACPI THERMAL DRIVER
M:      Zhang Rui <rui.zhang@intel.com>
L:      linux-acpi@vger.kernel.org
W:      http://www.lesswatts.org/projects/acpi/
S:      Supported
F:      drivers/acpi/*thermal*

ACPI VIDEO DRIVER
M:      Zhang Rui <rui.zhang@intel.com>
L:      linux-acpi@vger.kernel.org
W:      http://www.lesswatts.org/projects/acpi/
S:      Supported
F:      drivers/acpi/video.c

ACPI WMI DRIVER
L:      platform-driver-x86@vger.kernel.org
S:      Orphan
F:      drivers/platform/x86/wmi.c

AD1889 ALSA SOUND DRIVER
M:      Thibaut Varene <T-Bone@parisc-linux.org>
W:      http://wiki.parisc-linux.org/AD1889
L:      linux-parisc@vger.kernel.org
S:      Maintained
F:      sound/pci/ad1889.*

AD525X ANALOG DEVICES DIGITAL POTENTIOMETERS DRIVER
M:      Michael Hennerich <michael.hennerich@analog.com>
L:      device-drivers-devel@blackfin.uclinux.org
W:      http://wiki.analog.com/AD5254
S:      Supported
F:      drivers/misc/ad525x_dpot.c

AD5398 CURRENT REGULATOR DRIVER (AD5398/AD5821)
M:      Michael Hennerich <michael.hennerich@analog.com>
L:      device-drivers-devel@blackfin.uclinux.org
W:      http://wiki.analog.com/AD5398
S:      Supported
F:      drivers/regulator/ad5398.c

AD714X CAPACITANCE TOUCH SENSOR DRIVER (AD7142/3/7/8/7A)
M:      Michael Hennerich <michael.hennerich@analog.com>
L:      device-drivers-devel@blackfin.uclinux.org
W:      http://wiki.analog.com/AD7142
S:      Supported
F:      drivers/input/misc/ad714x.c

AD7877 TOUCHSCREEN DRIVER
```

```
M:      Michael Hennerich <michael.hennerich@analog.com>
L:      device-drivers-devel@blackfin.uclinux.org
W:      http://wiki.analog.com/AD7877
S:      Supported
F:      drivers/input/touchscreen/ad7877.c

AD7879 TOUCHSCREEN DRIVER (AD7879/AD7889)
M:      Michael Hennerich <michael.hennerich@analog.com>
L:      device-drivers-devel@blackfin.uclinux.org
W:      http://wiki.analog.com/AD7879
S:      Supported
F:      drivers/input/touchscreen/ad7879.c

ADDRESS SPACE LAYOUT RANDOMIZATION (ASLR)
M:      Jiri Kosina <jkosina@suse.cz>
S:      Maintained

ADM1025 HARDWARE MONITOR DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/adm1025
F:      drivers/hwmon/adm1025.c

ADM1029 HARDWARE MONITOR DRIVER
M:      Corentin Labbe <corentin.labbe@geomatys.fr>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/adm1029.c

ADM8211 WIRELESS DRIVER
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/
S:      Orphan
F:      drivers/net/wireless/adm8211.*

ADP1653 FLASH CONTROLLER DRIVER
M:      Sakari Ailus <sakari.ailus@iki.fi>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/i2c/adp1653.c
F:      include/media/adp1653.h

ADP5520 BACKLIGHT DRIVER WITH IO EXPANDER (ADP5520/ADP5501)
M:      Michael Hennerich <michael.hennerich@analog.com>
L:      device-drivers-devel@blackfin.uclinux.org
W:      http://wiki.analog.com/ADP5520
S:      Supported
F:      drivers/mfd/adp5520.c
F:      drivers/video/backlight/adp5520_bl.c
F:      drivers/leds/leds-adp5520.c
F:      drivers/gpio/gpio-adp5520.c
F:      drivers/input/keyboard/adp5520-keys.c

ADP5588 QWERTY KEYPAD AND IO EXPANDER DRIVER (ADP5588/ADP5587)
M:      Michael Hennerich <michael.hennerich@analog.com>
L:      device-drivers-devel@blackfin.uclinux.org
```

```
W:      http://wiki.analog.com/ADP5588
S:      Supported
F:      drivers/input/keyboard/adp5588-keys.c
F:      drivers/gpio/gpio-adp5588.c

ADP8860 BACKLIGHT DRIVER (ADP8860/ADP8861/ADP8863)
M:      Michael Hennerich <michael.hennerich@analog.com>
L:      device-drivers-devel@blackfin.uclinux.org
W:      http://wiki.analog.com/ADP8860
S:      Supported
F:      drivers/video/backlight/adp8860_bl.c

ADS1015 HARDWARE MONITOR DRIVER
M:      Dirk Eibach <eibach@gdsys.de>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/ads1015
F:      drivers/hwmon/ads1015.c
F:      include/linux/i2c/ads1015.h

ADT746X FAN DRIVER
M:      Colin Leroy <colin@colino.net>
S:      Maintained
F:      drivers/macintosh/therm_adt746x.c

ADT7475 HARDWARE MONITOR DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/adt7475
F:      drivers/hwmon/adt7475.c

ADXL34X THREE-AXIS DIGITAL ACCELEROMETER DRIVER (ADXL345/ADXL346)
M:      Michael Hennerich <michael.hennerich@analog.com>
L:      device-drivers-devel@blackfin.uclinux.org
W:      http://wiki.analog.com/ADXL345
S:      Supported
F:      drivers/input/misc/adxl34x.c

ADVANSYS SCSI DRIVER
M:      Matthew Wilcox <matthew@wil.cx>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      Documentation/scsi/advansys.txt
F:      drivers/scsi/advansys.c

AEDSP16 DRIVER
M:      Riccardo Facchetti <fizban@tin.it>
S:      Maintained
F:      sound/oss/aedsp16.c

AF9013 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
```

```
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/dvb-frontends/af9013*

AF9033 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/dvb-frontends/af9033*

AFFS FILE SYSTEM
L:      linux-fsdevel@vger.kernel.org
S:      Orphan
F:      Documentation/filesystems/affs.txt
F:      fs/affs/

AFS FILESYSTEM & AF_RXRPC SOCKET DOMAIN
M:      David Howells <dhowells@redhat.com>
L:      linux-afs@lists.infradead.org
S:      Supported
F:      fs/afs/
F:      include/net/af_rxrpc.h
F:      net/rxrpc/af_rxrpc.c

AGPGART DRIVER
M:      David Airlie <airlied@linux.ie>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/airlied/drm-2.6.git
S:      Maintained
F:      drivers/char/agp/
F:      include/linux/agp*
F:      include/uapi/linux/agp*

AHA152X SCSI DRIVER
M:      "Juergen E. Fischer" <fischer@norbit.de>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/aha152x*
F:      drivers/scsi/pcmcia/aha152x*

AIC7XXX / AIC79XX SCSI DRIVER
M:      Hannes Reinecke <hare@suse.de>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/aic7xxx/
F:      drivers/scsi/aic7xxx_old/

AIMSLAB FM RADIO RECEIVER DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/radio/radio-aimslab*
```

```
AIO
M:      Benjamin LaHaise <bcrl@kvack.org>
L:      linux-aio@kvack.org
S:      Supported
F:      fs/aio.c
F:      include/linux/*aio*.h

ALCATEL SPEEDTOUCH USB DRIVER
M:      Duncan Sands <duncan.sands@free.fr>
L:      linux-usb@vger.kernel.org
W:      http://www.linux-usb.org/SpeedTouch/
S:      Maintained
F:      drivers/usb/atm/speedtch.c
F:      drivers/usb/atm/usbatm.c

ALCHEMY AU1XX0 MMC DRIVER
M:      Manuel Lauss <manuel.lauss@gmail.com>
S:      Maintained
F:      drivers/mmc/host/au1xmmc.c

ALI1563 I2C DRIVER
M:      Rudolf Marek <r.marek@assembler.cz>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      Documentation/i2c/busses/i2c-ali1563
F:      drivers/i2c/busses/i2c-ali1563.c

ALPHA PORT
M:      Richard Henderson <rth@twiddle.net>
M:      Ivan Kokshaysky <ink@jurassic.park.msu.ru>
M:      Matt Turner <mattst88@gmail.com>
S:      Odd Fixes
L:      linux-alpha@vger.kernel.org
F:      arch/alpha/

ALTERA UART/JTAG UART SERIAL DRIVERS
M:      Tobias Klauser <tklauser@distanz.ch>
L:      linux-serial@vger.kernel.org
L:      nios2-dev@sopc.et.ntust.edu.tw (moderated for non-subscribers)
S:      Maintained
F:      drivers/tty/serial/altera_uart.c
F:      drivers/tty/serial/altera_jtaguart.c
F:      include/linux/altera_uart.h
F:      include/linux/altera_jtaguart.h

AMD FAM15H PROCESSOR POWER MONITORING DRIVER
M:      Andreas Herrmann <herrmann.der.user@googlemail.com>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/fam15h_power
F:      drivers/hwmon/fam15h_power.c

AMD GEODE CS5536 USB DEVICE CONTROLLER DRIVER
M:      Thomas Dahlmann <dahlmann.thomas@arcor.de>
L:      linux-geode@lists.infradead.org (moderated for non-subscribers)
S:      Supported
```

```
F:      drivers/usb/gadget/amd5536udc.*

AMD GEODE PROCESSOR/CHIPSET SUPPORT
P:      Andres Salomon <dilinger@queued.net>
L:      linux-geode@lists.infradead.org (moderated for non-subscribers)
W:      http://www.amd.com/us-
en/ConnectivitySolutions/TechnicalResources/0,,50_2334_2452_11363,00.html
S:      Supported
F:      drivers/char/hw_random/geode-rng.c
F:      drivers/crypto/geode*
F:      drivers/video/geode/
F:      arch/x86/include/asm/geode.h

AMD IOMMU (AMD-VI)
M:      Joerg Roedel <joro@8bytes.org>
L:      iommu@lists.linux-foundation.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/joro/iommu.git
S:      Maintained
F:      drivers/iommu/amd_iommu*.[ch]
F:      include/linux/amd-iommu.h

AMD MICROCODE UPDATE SUPPORT
M:      Andreas Herrmann <herrmann.der.user@googlemail.com>
L:      amd64-microcode@amd64.org
S:      Maintained
F:      arch/x86/kernel/microcode_amd.c

AMS (Apple Motion Sensor) DRIVER
M:      Michael Hanselmann <linux-kernel@hansmi.ch>
S:      Supported
F:      drivers/macintosh/ams/

AMSO1100 RNIC DRIVER
M:      Tom Tucker <tom@opengridcomputing.com>
M:      Steve Wise <swise@opengridcomputing.com>
L:      linux-rdma@vger.kernel.org
S:      Maintained
F:      drivers/infiniband/hw/amso1100/

ANALOG DEVICES INC AD9389B DRIVER
M:      Hans Verkuil <hans.verkuil@cisco.com>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/i2c/ad9389b*

ANALOG DEVICES INC ADV7604 DRIVER
M:      Hans Verkuil <hans.verkuil@cisco.com>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/i2c/adv7604*

ANALOG DEVICES INC ASOC CODEC DRIVERS
M:      Lars-Peter Clausen <lars@metafoo.de>
L:      device-drivers-devel@blackfin.uclinux.org
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
W:      http://wiki.analog.com/
S:      Supported
```

```
F:      sound/soc/codecs/adau*
F:      sound/soc/codecs/adav*
F:      sound/soc/codecs/ad1*
F:      sound/soc/codecs/ssm*
F:      sound/soc/codecs/sigmadsp.*

ANALOG DEVICES INC ASOC DRIVERS
L:      uclinux-dist-devel@blackfin.uclinux.org
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
W:      http://blackfin.uclinux.org/
S:      Supported
F:      sound/soc/blackfin/*

AOA (Apple Onboard Audio) ALSA DRIVER
M:      Johannes Berg <johannes@sipsolutions.net>
L:      linuxppc-dev@lists.ozlabs.org
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
S:      Maintained
F:      sound/aoa/

APM DRIVER
M:      Jiri Kosina <jkosina@suse.cz>
S:      Odd fixes
F:      arch/x86/kernel/apm_32.c
F:      include/linux/apm_bios.h
F:      include/uapi/linux/apm_bios.h
F:      drivers/char/apm-emulation.c

APPLE BCM5974 MULTITOUCH DRIVER
M:      Henrik Rydberg <rydberg@euromail.se>
L:      linux-input@vger.kernel.org
S:      Maintained
F:      drivers/input/mouse/bcm5974.c

APPLE SMC DRIVER
M:      Henrik Rydberg <rydberg@euromail.se>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/applesmc.c

APPLETALK NETWORK LAYER
M:      Arnaldo Carvalho de Melo <acme@ghostprotocols.net>
S:      Maintained
F:      drivers/net/appletalk/
F:      net/appletalk/

ARASAN COMPACT FLASH PATA CONTROLLER
M:      Viresh Kumar <viresh.linux@gmail.com>
L:      linux-ide@vger.kernel.org
S:      Maintained
F:      include/linux/pata_arasan_cf_data.h
F:      drivers/ata/pata_arasan_cf.c

ARC FRAMEBUFFER DRIVER
M:      Jaya Kumar <jayalk@intworks.biz>
S:      Maintained
F:      drivers/video/arcfb.c
```

```
F:      drivers/video/fb_defio.c

ARM MFM AND FLOPPY DRIVERS
M:      Ian Molton <spyro@f2s.com>
S:      Maintained
F:      arch/arm/lib/floppydma.S
F:      arch/arm/include/asm/floppy.h

ARM PMU PROFILING AND DEBUGGING
M:      Will Deacon <will.deacon@arm.com>
S:      Maintained
F:      arch/arm/kernel/perf_event*
F:      arch/arm/oprofile/common.c
F:      arch/arm/include/asm/pmu.h
F:      arch/arm/kernel/hw_breakpoint.c
F:      arch/arm/include/asm/hw_breakpoint.h

ARM PORT
M:      Russell King <linux@arm.linux.org.uk>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.arm.linux.org.uk/
S:      Maintained
F:      arch/arm/

ARM SUB-ARCHITECTURES
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-*/
F:      arch/arm/plat-*/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/arm/arm-soc.git

ARM PRIMECELL AACI PL041 DRIVER
M:      Russell King <linux@arm.linux.org.uk>
S:      Maintained
F:      sound/arm/aaci.*

ARM PRIMECELL CLCD PL110 DRIVER
M:      Russell King <linux@arm.linux.org.uk>
S:      Maintained
F:      drivers/video/amba-clcd.*

ARM PRIMECELL KMI PL050 DRIVER
M:      Russell King <linux@arm.linux.org.uk>
S:      Maintained
F:      drivers/input/serio/ambakmi.*
F:      include/linux/amba/kmi.h

ARM PRIMECELL MMCI PL180/1 DRIVER
M:      Russell King <linux@arm.linux.org.uk>
S:      Maintained
F:      drivers/mmc/host/mmci.*
F:      include/linux/amba/mmci.h

ARM PRIMECELL UART PL010 AND PL011 DRIVERS
M:      Russell King <linux@arm.linux.org.uk>
S:      Maintained
F:      drivers/tty/serial/amba-pl01*.c
```

```
F:      include/linux/amba/serial.h

ARM PRIMECELL BUS SUPPORT
M:      Russell King <linux@arm.linux.org.uk>
S:      Maintained
F:      drivers/amba/
F:      include/linux/amba/bus.h

ARM/ADS SPHERE MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/AFEB9260 MACHINE SUPPORT
M:      Sergey Lapin <slapin@ossfans.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/AJECO 1ARM MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/Allwinner A1X SoC support
M:      Maxime Ripard <maxime.ripard@free-electrons.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-sunxi/

ARM/ATMEL AT91RM9200 AND AT91SAM ARM ARCHITECTURES
M:      Andrew Victor <linux@maxim.org.za>
M:      Nicolas Ferre <nicolas.ferre@atmel.com>
M:      Jean-Christophe Plagniol-Villard <plagnioj@jcrosoft.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://maxim.org.za/at91_26.html
W:      http://www.linux4sam.org
S:      Supported
F:      arch/arm/mach-at91/

ARM/CALXEDA HIGHBANK ARCHITECTURE
M:      Rob Herring <rob.herring@calxeda.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-highbank/

ARM/CAVIUM NETWORKS CNS3XXX MACHINE SUPPORT
M:      Anton Vorontsov <avorontsov@mvista.com>
S:      Maintained
F:      arch/arm/mach-cns3xxx/
T:      git git://git.infradead.org/users/cbou/linux-cns3xxx.git

ARM/CIRRUS LOGIC CLPS711X ARM ARCHITECTURE
M:      Alexander Shiyan <shc_work@mail.ru>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Odd Fixes
F:      arch/arm/mach-clps711x/
```

```
ARM/CIRRUS LOGIC EP93XX ARM ARCHITECTURE
M:      Hartley Sweeten <hsweeten@visionengravers.com>
M:      Ryan Mallon <rmallon@gmail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-ep93xx/
F:      arch/arm/mach-ep93xx/include/mach/

ARM/CIRRUS LOGIC EDB9315A MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/CLKDEV SUPPORT
M:      Russell King <linux@arm.linux.org.uk>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/include/asm/clkdev.h
F:      drivers/clk/clkdev.c

ARM/COMPULAB CM-X270/EM-X270 and CM-X300 MACHINE SUPPORT
M:      Mike Rapoport <mike@compulab.co.il>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/CONTEC MICRO9 MACHINE SUPPORT
M:      Hubert Feurstein <hubert.feurstein@contec.at>
S:      Maintained
F:      arch/arm/mach-ep93xx/micro9.c

ARM/CORGI MACHINE SUPPORT
M:      Richard Purdie <rpurdie@rpsys.net>
S:      Maintained

ARM/CORTINA SYSTEMS GEMINI ARM ARCHITECTURE
M:      Hans Ulli Kroll <ulli.kroll@googlemail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
T:      git git://git.berlios.de/gemini-board
S:      Maintained
F:      arch/arm/mach-gemini/

ARM/CSR SIRFPRIMA2 MACHINE SUPPORT
M:      Barry Song <baohua.song@csr.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-prima2/
F:      drivers/dma/sirf-dma.c
F:      drivers/i2c/busses/i2c-sirf.c
F:      drivers/mmc/host/sdhci-sirf.c
F:      drivers/pinctrl/pinctrl-sirf.c
F:      drivers/spi/spi-sirf.c

ARM/EBSA110 MACHINE SUPPORT
M:      Russell King <linux@arm.linux.org.uk>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.arm.linux.org.uk/
S:      Maintained
```

```
F:      arch/arm/mach-ebsa110/
F:      drivers/net/ethernet/amd/am79c961a.*

ARM/EZX SMARTPHONES (A780, A910, A1200, E680, ROKR E2 and ROKR E6)
M:      Daniel Ribeiro <drwyrm@gmail.com>
M:      Stefan Schmidt <stefan@openezx.org>
M:      Harald Welte <laforge@openezx.org>
L:      openezx-devel@lists.openezx.org (moderated for non-subscribers)
W:      http://www.openezx.org/
S:      Maintained
T:      topgit git://git.openezx.org/openezx.git
F:      arch/arm/mach-pxa/ezx.c

ARM/FARADAY FA526 PORT
M:      Hans Ulli Kroll <ulli.kroll@googlemail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
T:      git git://git.berlios.de/gemini-board
F:      arch/arm/mm/*-fa*

ARM/FOOTBRIDGE ARCHITECTURE
M:      Russell King <linux@arm.linux.org.uk>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.arm.linux.org.uk/
S:      Maintained
F:      arch/arm/include/asm/hardware/dec21285.h
F:      arch/arm/mach-footbridge/

ARM/FREESCALE IMX / MXC ARM ARCHITECTURE
M:      Sascha Hauer <kernel@pengutronix.de>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
T:      git git://git.pengutronix.de/git/imx/linux-2.6.git
F:      arch/arm/mach-imx/
F:      arch/arm/configs/imx*_defconfig

ARM/FREESCALE IMX6
M:      Shawn Guo <shawn.guo@linaro.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
T:      git git://git.linaro.org/people/shawnguo/linux-2.6.git
F:      arch/arm/mach-imx/*imx6*

ARM/FREESCALE MXS ARM ARCHITECTURE
M:      Shawn Guo <shawn.guo@linaro.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
T:      git git://git.linaro.org/people/shawnguo/linux-2.6.git
F:      arch/arm/mach-mxs/

ARM/GLOMATION GESBC9312SX MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/GUMSTIX MACHINE SUPPORT
M:      Steve Sakoman <sakoman@gmail.com>
```

```
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/H4700 (HP IPAQ HX4700) MACHINE SUPPORT
M:      Philipp Zabel <philipp.zabel@gmail.com>
M:      Paul Parsons <lost.distance@yahoo.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-pxa/hx4700.c
F:      arch/arm/mach-pxa/include/mach/hx4700.h
F:      sound/soc/pxa/hx4700.c

ARM/HP JORNADA 7XX MACHINE SUPPORT
M:      Kristoffer Ericson <kristoffer.ericson@gmail.com>
W:      www.jlime.com
S:      Maintained
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/kristoffer/linux-
hpc.git
F:      arch/arm/mach-sa1100/jornada720.c
F:      arch/arm/mach-sa1100/include/mach/jornada720.h

ARM/IGEP MACHINE SUPPORT
M:      Enric Balletbo i Serra <eballetbo@gmail.com>
M:      Javier Martinez Canillas <javier@dowhile0.org>
L:      linux-omap@vger.kernel.org
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-omap2/board-igep0020.c

ARM/INCOME PXA270 SUPPORT
M:      Marek Vasut <marek.vasut@gmail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-pxa/colibri-pxa270-income.c

ARM/INTEL IOP32X ARM ARCHITECTURE
M:      Lennert Buytenhek <kernel@wantstofly.org>
M:      Dan Williams <djbw@fb.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/INTEL IOP33X ARM ARCHITECTURE
M:      Dan Williams <djbw@fb.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/INTEL IOP13XX ARM ARCHITECTURE
M:      Lennert Buytenhek <kernel@wantstofly.org>
M:      Dan Williams <djbw@fb.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/INTEL IQ81342EX MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
M:      Dan Williams <djbw@fb.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
```

```
ARM/INTEL IXDP2850 MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/INTEL IXP4XX ARM ARCHITECTURE
M:      Imre Kaloz <kaloz@openwrt.org>
M:      Krzysztof Halasa <khc@pm.waw.pl>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-ixp4xx/

ARM/INTEL RESEARCH IMOTE/STARGATE 2 MACHINE SUPPORT
M:      Jonathan Cameron <jic23@cam.ac.uk>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-pxa/stargate2.c
F:      drivers/pcmcia/pxa2xx_stargate2.c

ARM/INTEL XSC3 (MANZANO) ARM CORE
M:      Lennert Buytenhek <kernel@wantstofly.org>
M:      Dan Williams <djbw@fb.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/IP FABRICS DOUBLE ESPRESSO MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/LOGICPD PXA270 MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/MAGICIAN MACHINE SUPPORT
M:      Philipp Zabel <philipp.zabel@gmail.com>
S:      Maintained

ARM/Marvell Armada 370 and Armada XP SOC support
M:      Jason Cooper <jason@lakedaemon.net>
M:      Andrew Lunn <andrew@lunn.ch>
M:      Gregory Clement <gregory.clement@free-electrons.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-mvebu/

ARM/Marvell Dove/Kirkwood/MV78xx0/Orion SOC support
M:      Jason Cooper <jason@lakedaemon.net>
M:      Andrew Lunn <andrew@lunn.ch>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-dove/
F:      arch/arm/mach-kirkwood/
F:      arch/arm/mach-mv78xx0/
F:      arch/arm/mach-orion5x/
```

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F:      arch/arm/plat-orion/

ARM/Orion SoC/Technologic Systems TS-78xx platform support
M:      Alexander Clouter <alex@digriz.org.uk>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.digriz.org.uk/ts78xx/kernel
S:      Maintained
F:      arch/arm/mach-orion5x/ts78xx-*

ARM/MICREL KS8695 ARCHITECTURE
M:      Greg Ungerer <gerg@uclinux.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
F:      arch/arm/mach-ks8695
S:      Odd Fixes

ARM/MIOA701 MACHINE SUPPORT
M:      Robert Jarzmik <robert.jarzmik@free.fr>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
F:      arch/arm/mach-pxa/mioa701.c
S:      Maintained

ARM/NEC MOBILEPRO 900/c MACHINE SUPPORT
M:      Michael Petchkovsky <mkpetch@internode.on.net>
S:      Maintained

ARM/NOMADIK ARCHITECTURE
M:      Alessandro Rubini <rubini@unipv.it>
M:      Linus Walleij <linus.walleij@linaro.org>
M:      STEricsson <STEricsson_nomadik_linux@list.st.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-nomadik/
F:      arch/arm/plat-nomadik/
F:      drivers/i2c/busses/i2c-nomadik.c
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/linusw/linux-
nomadik.git

ARM/OPENMOKO NEO FREERUNNER (GTA02) MACHINE SUPPORT
M:      Nelson Castillo <arhuaco@freaks-unidos.net>
L:      openmoko-kernel@lists.openmoko.org (subscribers-only)
W:      http://wiki.openmoko.org/wiki/Neo_FreeRunner
S:      Supported

ARM/QUALCOMM MSM MACHINE SUPPORT
M:      David Brown <davidb@codeaurora.org>
M:      Daniel Walker <dwalker@fifo99.com>
M:      Bryan Huntsman <bryanh@codeaurora.org>
L:      linux-arm-msm@vger.kernel.org
F:      arch/arm/mach-msm/
F:      drivers/video/msm/
F:      drivers/mmc/host/msm_sdcc.c
F:      drivers/mmc/host/msm_sdcc.h
F:      drivers/tty/serial/msm_serial.h
F:      drivers/tty/serial/msm_serial.c
F:      drivers/*/pm8???-*
F:      drivers/ssbi/
F:      include/linux/mfd/pm8xxx/
```

```
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davidb/linux-msm.git
S:      Maintained

ARM/TOSA MACHINE SUPPORT
M:      Dmitry Eremin-Solenikov <dbaryshkov@gmail.com>
M:      Dirk Opfer <dirk@opfer-online.de>
S:      Maintained

ARM/PALMTX,PALMT5,PALMLD,PALMTE2,PALMTC SUPPORT
M:      Marek Vasut <marek.vasut@gmail.com>
L:      linux-arm-kernel@lists.infradead.org
W:      http://hackndev.com
S:      Maintained
F:      arch/arm/mach-pxa/include/mach/palmtx.h
F:      arch/arm/mach-pxa/palmtx.c
F:      arch/arm/mach-pxa/include/mach/palmt5.h
F:      arch/arm/mach-pxa/palmt5.c
F:      arch/arm/mach-pxa/include/mach/palmld.h
F:      arch/arm/mach-pxa/palmld.c
F:      arch/arm/mach-pxa/include/mach/palmte2.h
F:      arch/arm/mach-pxa/palmte2.c
F:      arch/arm/mach-pxa/include/mach/palmtc.h
F:      arch/arm/mach-pxa/palmtc.c

ARM/PALM TREO SUPPORT
M:      Tomas Cech <sleep_walker@suse.cz>
L:      linux-arm-kernel@lists.infradead.org
W:      http://hackndev.com
S:      Maintained
F:      arch/arm/mach-pxa/include/mach/palmtreo.h
F:      arch/arm/mach-pxa/palmtreo.c

ARM/PALMZ72 SUPPORT
M:      Sergey Lapin <slapin@ossfans.org>
L:      linux-arm-kernel@lists.infradead.org
W:      http://hackndev.com
S:      Maintained
F:      arch/arm/mach-pxa/include/mach/palmz72.h
F:      arch/arm/mach-pxa/palmz72.c

ARM/PLEB SUPPORT
M:      Peter Chubb <pleb@gelato.unsw.edu.au>
W:      http://www.disy.cse.unsw.edu.au/Hardware/PLEB
S:      Maintained

ARM/PT DIGITAL BOARD PORT
M:      Stefan Eletzhofer <stefan.eletzhofer@eletztrick.de>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.arm.linux.org.uk/
S:      Maintained

ARM/RADISYS ENP2611 MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/RISCPC ARCHITECTURE
```

```
M:      Russell King <linux@arm.linux.org.uk>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.arm.linux.org.uk/
S:      Maintained
F:      arch/arm/include/asm/hardware/entry-macro-iomd.S
F:      arch/arm/include/asm/hardware/ioc.h
F:      arch/arm/include/asm/hardware/iomd.h
F:      arch/arm/include/asm/hardware/memc.h
F:      arch/arm/mach-rpc/
F:      drivers/net/ethernet/8390/etherh.c
F:      drivers/net/ethernet/i825xx/ether1*
F:      drivers/net/ethernet/seeq/ether3*
F:      drivers/scsi/arm/

ARM/SHARK MACHINE SUPPORT
M:      Alexander Schulz <alex@shark-linux.de>
W:      http://www.shark-linux.de/shark.html
S:      Maintained

ARM/SAMSUNG ARM ARCHITECTURES
M:      Ben Dooks <ben-linux@fluff.org>
M:      Kukjin Kim <kgene.kim@samsung.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
L:      linux-samsung-soc@vger.kernel.org (moderated for non-subscribers)
W:      http://www.fluff.org/ben/linux/
S:      Maintained
F:      arch/arm/plat-samsung/
F:      arch/arm/plat-s3c24xx/
F:      arch/arm/mach-s3c24*/
F:      arch/arm/mach-s3c64xx/
F:      drivers/*/*s3c2410*
F:      drivers/*/*/*s3c2410*
F:      drivers/spi/spi-s3c*
F:      sound/soc/samsung/*

ARM/S5P EXYNOS ARM ARCHITECTURES
M:      Kukjin Kim <kgene.kim@samsung.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
L:      linux-samsung-soc@vger.kernel.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-s5p*/
F:      arch/arm/mach-exynos*/

ARM/SAMSUNG MOBILE MACHINE SUPPORT
M:      Kyungmin Park <kyungmin.park@samsung.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-s5pv210/mach-aquila.c
F:      arch/arm/mach-s5pv210/mach-goni.c
F:      arch/arm/mach-exynos/mach-universal_c210.c
F:      arch/arm/mach-exynos/mach-nuri.c

ARM/SAMSUNG S5P SERIES 2D GRAPHICS ACCELERATION (G2D) SUPPORT
M:      Kyungmin Park <kyungmin.park@samsung.com>
M:      Kamil Debski <k.debski@samsung.com>
L:      linux-arm-kernel@lists.infradead.org
L:      linux-media@vger.kernel.org
```

```
S:      Maintained
F:      drivers/media/platform/s5p-g2d/

ARM/SAMSUNG S5P SERIES FIMC SUPPORT
M:      Kyungmin Park <kyungmin.park@samsung.com>
M:      Sylwester Nawrocki <s.nawrocki@samsung.com>
L:      linux-arm-kernel@lists.infradead.org
L:      linux-media@vger.kernel.org
S:      Maintained
F:      arch/arm/plat-samsung/include/plat/*fimc*
F:      drivers/media/platform/s5p-fimc/

ARM/SAMSUNG S5P SERIES Multi Format Codec (MFC) SUPPORT
M:      Kyungmin Park <kyungmin.park@samsung.com>
M:      Kamil Debski <k.debski@samsung.com>
M:      Jeongtae Park <jtp.park@samsung.com>
L:      linux-arm-kernel@lists.infradead.org
L:      linux-media@vger.kernel.org
S:      Maintained
F:      arch/arm/plat-samsung/s5p-dev-mfc.c
F:      drivers/media/platform/s5p-mfc/

ARM/SAMSUNG S5P SERIES TV SUBSYSTEM SUPPORT
M:      Kyungmin Park <kyungmin.park@samsung.com>
M:      Tomasz Stanislawski <t.stanislaws@samsung.com>
L:      linux-arm-kernel@lists.infradead.org
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/platform/s5p-tv/

ARM/SHMOBILE ARM ARCHITECTURE
M:      Simon Horman <horms@verge.net.au>
M:      Magnus Damm <magnus.damm@gmail.com>
L:      linux-sh@vger.kernel.org
W:      http://oss.renesas.com
Q:      http://patchwork.kernel.org/project/linux-sh/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/horms/renesas.git
next
S:      Supported
F:      arch/arm/mach-shmobile/
F:      drivers/sh/

ARM/SOCFPGA ARCHITECTURE
M:      Dinh Nguyen <dinguyen@altera.com>
S:      Maintained
F:      arch/arm/mach-socfpga/

ARM/SOCFPGA CLOCK FRAMEWORK SUPPORT
M:      Dinh Nguyen <dinguyen@altera.com>
S:      Maintained
F:      drivers/clk/socfpga/

ARM/TECHNOLOGIC SYSTEMS TS7250 MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
```

```
ARM/TETON BGA MACHINE SUPPORT
M:      "Mark F. Brown" <mark.brown314@gmail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/THECUS N2100 MACHINE SUPPORT
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained

ARM/NUVOTON W90X900 ARM ARCHITECTURE
M:      Wan ZongShun <mcuos.com@gmail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.mcuos.com
S:      Maintained
F:      arch/arm/mach-w90x900/
F:      drivers/input/keyboard/w90p910_keypad.c
F:      drivers/input/touchscreen/w90p910_ts.c
F:      drivers/watchdog/nuc900_wdt.c
F:      drivers/net/ethernet/nuvoton/w90p910_ether.c
F:      drivers/mtd/nand/nuc900_nand.c
F:      drivers/rtc/rtc-nuc900.c
F:      drivers/spi/spi-nuc900.c
F:      drivers/usb/host/ehci-w90x900.c
F:      drivers/video/nuc900fb.c

ARM/U300 MACHINE SUPPORT
M:      Linus Walleij <linus.walleij@linaro.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Supported
F:      arch/arm/mach-u300/
F:      drivers/i2c/busses/i2c-stu300.c
F:      drivers/rtc/rtc-coh901331.c
F:      drivers/watchdog/coh901327_wdt.c
F:      drivers/dma/coh901318*
F:      drivers/mfd/ab3100*
F:      drivers/rtc/rtc-ab3100.c
F:      drivers/rtc/rtc-coh901331.c
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/linusw/linux-
stericsson.git

ARM/Ux500 ARM ARCHITECTURE
M:      Srinidhi Kasagar <srinidhi.kasagar@stericsson.com>
M:      Linus Walleij <linus.walleij@linaro.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-ux500/
F:      drivers/clocksource/clksrc-dbx500-prcmu.c
F:      drivers/dma/ste_dma40*
F:      drivers/hwspinlock/u8500_hsem.c
F:      drivers/mfd/abx500*
F:      drivers/mfd/ab8500*
F:      drivers/mfd/dbx500*
F:      drivers/mfd/db8500*
F:      drivers/pinctrl/pinctrl-nomadik*
F:      drivers/rtc/rtc-ab8500.c
F:      drivers/rtc/rtc-pl031.c
```

```
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/linusw/linux-
stericsson.git

ARM/VFP SUPPORT
M:      Russell King <linux@arm.linux.org.uk>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.arm.linux.org.uk/
S:      Maintained
F:      arch/arm/vfp/

ARM/VOIPAC PXA270 SUPPORT
M:      Marek Vasut <marek.vasut@gmail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-pxa/vpac270.c
F:      arch/arm/mach-pxa/include/mach/vpac270.h

ARM/VT8500 ARM ARCHITECTURE
M:      Tony Prisk <linux@prisktech.co.nz>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-vt8500/
F:      drivers/clocksource/vt8500_timer.c
F:      drivers/gpio/gpio-vt8500.c
F:      drivers/mmc/host/wmt-sdmmc.c
F:      drivers/pwm/pwm-vt8500.c
F:      drivers/rtc/rtc-vt8500.c
F:      drivers/tty/serial/vt8500_serial.c
F:      drivers/usb/host/ehci-vt8500.c
F:      drivers/usb/host/uhci-platform.c
F:      drivers/video/vt8500lcdfb.*
F:      drivers/video/wm8505fb*
F:      drivers/video/wmt_ge_rops.*

ARM/ZIPIT Z2 SUPPORT
M:      Marek Vasut <marek.vasut@gmail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-pxa/z2.c
F:      arch/arm/mach-pxa/include/mach/z2.h

ARM/ZYNQ ARCHITECTURE
M:      Michal Simek <michal.simek@xilinx.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://wiki.xilinx.com
T:      git git://git.xilinx.com/linux-xlnx.git
S:      Supported
F:      arch/arm/mach-zynq/

ARM64 PORT (AARCH64 ARCHITECTURE)
M:      Catalin Marinas <catalin.marinas@arm.com>
M:      Will Deacon <will.deacon@arm.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm64/
F:      Documentation/arm64/
```

```
AS3645A LED FLASH CONTROLLER DRIVER
M:      Laurent Pinchart <laurent.pinchart@ideasonboard.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/i2c/as3645a.c
F:      include/media/as3645a.h

ASC7621 HARDWARE MONITOR DRIVER
M:      George Joseph <george.joseph@fairview5.com>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/asc7621
F:      drivers/hwmon/asc7621.c

ASUS NOTEBOOKS AND EEEPC ACPI/WMI EXTRAS DRIVERS
M:      Corentin Chary <corentin.chary@gmail.com>
L:      acpi4asus-user@lists.sourceforge.net
L:      platform-driver-x86@vger.kernel.org
W:      http://acpi4asus.sf.net
S:      Maintained
F:      drivers/platform/x86/asus*.c
F:      drivers/platform/x86/eeepc*.c

ASYNCHRONOUS TRANSFERS/TRANSFORMS (IOAT) API
M:      Dan Williams <djbw@fb.com>
W:      http://sourceforge.net/projects/xscaleiop
S:      Maintained
F:      Documentation/crypto/async-tx-api.txt
F:      crypto/async_tx/
F:      drivers/dma/
F:      include/linux/dmaengine.h
F:      include/linux/async_tx.h

AT24 EEPROM DRIVER
M:      Wolfram Sang <wsa@the-dreams.de>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      drivers/misc/eeprom/at24.c
F:      include/linux/i2c/at24.h

ATA OVER ETHERNET (AOE) DRIVER
M:      "Ed L. Cashin" <ecashin@coraid.com>
W:      http://support.coraid.com/support/linux
S:      Supported
F:      Documentation/aoe/
F:      drivers/block/aoe/

ATHEROS ATH GENERIC UTILITIES
M:      "Luis R. Rodriguez" <mcgrof@qca.qualcomm.com>
L:      linux-wireless@vger.kernel.org
S:      Supported
F:      drivers/net/wireless/ath/*

ATHEROS ATH5K WIRELESS DRIVER
M:      Jiri Slaby <jirislaby@gmail.com>
M:      Nick Kossifidis <mickflemm@gmail.com>
```

```
M:      "Luis R. Rodriguez" <mcgrof@qca.qualcomm.com>
L:      linux-wireless@vger.kernel.org
L:      ath5k-devel@lists.ath5k.org
W:      http://wireless.kernel.org/en/users/Drivers/ath5k
S:      Maintained
F:      drivers/net/wireless/ath/ath5k/

ATHEROS ATH6KL WIRELESS DRIVER
M:      Kalle Valo <kvalo@qca.qualcomm.com>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/en/users/Drivers/ath6kl
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/kvalo/ath6kl.git
S:      Supported
F:      drivers/net/wireless/ath/ath6kl/

ATHEROS ATH9K WIRELESS DRIVER
M:      "Luis R. Rodriguez" <mcgrof@qca.qualcomm.com>
M:      Jouni Malinen <jouni@qca.qualcomm.com>
M:      Vasanthakumar Thiagarajan <vthiagar@qca.qualcomm.com>
M:      Senthil Balasubramanian <senthilb@qca.qualcomm.com>
L:      linux-wireless@vger.kernel.org
L:      ath9k-devel@lists.ath9k.org
W:      http://wireless.kernel.org/en/users/Drivers/ath9k
S:      Supported
F:      drivers/net/wireless/ath/ath9k/

WILOCITY WIL6210 WIRELESS DRIVER
M:      Vladimir Kondratiev <qca_vkondrat@qca.qualcomm.com>
L:      linux-wireless@vger.kernel.org
L:      wil6210@qca.qualcomm.com
S:      Supported
W:      http://wireless.kernel.org/en/users/Drivers/wil6210
F:      drivers/net/wireless/ath/wil6210/

CARL9170 LINUX COMMUNITY WIRELESS DRIVER
M:      Christian Lamparter <chunkeey@googlemail.com>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/en/users/Drivers/carl9170
S:      Maintained
F:      drivers/net/wireless/ath/carl9170/

ATK0110 HWMON DRIVER
M:      Luca Tettamanti <kronos.it@gmail.com>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/asus_atk0110.c

ATI_REMOTE2 DRIVER
M:      Ville Syrjala <syrjala@sci.fi>
S:      Maintained
F:      drivers/input/misc/ati_remote2.c

ATLX ETHERNET DRIVERS
M:      Jay Cliburn <jcliburn@gmail.com>
M:      Chris Snook <chris.snook@gmail.com>
L:      netdev@vger.kernel.org
W:      http://sourceforge.net/projects/atl1
```

```
W:      http://atl1.sourceforge.net
S:      Maintained
F:      drivers/net/ethernet/atheros/

ATM
M:      Chas Williams <chas@cmf.nrl.navy.mil>
L:      linux-atm-general@lists.sourceforge.net (moderated for non-
subscribers)
L:      netdev@vger.kernel.org
W:      http://linux-atm.sourceforge.net
S:      Maintained
F:      drivers/atm/
F:      include/linux/atm*
F:      include/uapi/linux/atm*

ATMEL AT91 / AT32 MCI DRIVER
M:      Ludovic Desroches <ludovic.desroches@atmel.com>
S:      Maintained
F:      drivers/mmc/host/atmel-mci.c
F:      drivers/mmc/host/atmel-mci-regs.h

ATMEL AT91 / AT32 SERIAL DRIVER
M:      Nicolas Ferre <nicolas.ferre@atmel.com>
S:      Supported
F:      drivers/tty/serial/atmel_serial.c

ATMEL DMA DRIVER
M:      Nicolas Ferre <nicolas.ferre@atmel.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Supported
F:      drivers/dma/at_hdmac.c
F:      drivers/dma/at_hdmac_regs.h
F:      include/linux/platform_data/dma-atmel.h

ATMEL I2C DRIVER
M:      Ludovic Desroches <ludovic.desroches@atmel.com>
L:      linux-i2c@vger.kernel.org
S:      Supported
F:      drivers/i2c/busses/i2c-at91.c

ATMEL ISI DRIVER
M:      Josh Wu <josh.wu@atmel.com>
L:      linux-media@vger.kernel.org
S:      Supported
F:      drivers/media/platform/soc_camera/atmel-isi.c
F:      include/media/atmel-isi.h

ATMEL LCDFB DRIVER
M:      Nicolas Ferre <nicolas.ferre@atmel.com>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/atmel_lcdfb.c
F:      include/video/atmel_lcdc.h

ATMEL MACB ETHERNET DRIVER
M:      Nicolas Ferre <nicolas.ferre@atmel.com>
S:      Supported
```

```
F:      drivers/net/ethernet/cadence/

ATMEL SPI DRIVER
M:      Nicolas Ferre <nicolas.ferre@atmel.com>
S:      Supported
F:      drivers/spi/spi-atmel.*

ATMEL Timer Counter (TC) AND CLOCKSOURCE DRIVERS
M:      Nicolas Ferre <nicolas.ferre@atmel.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Supported
F:      drivers/misc/atmel_tclib.c
F:      drivers/clocksource/tcb_clksrc.c

ATMEL TSADCC DRIVER
M:      Josh Wu <josh.wu@atmel.com>
L:      linux-input@vger.kernel.org
S:      Supported
F:      drivers/input/touchscreen/atmel_tsadcc.c

ATMEL USBA UDC DRIVER
M:      Nicolas Ferre <nicolas.ferre@atmel.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Supported
F:      drivers/usb/gadget/atmel_usba_udc.*

ATMEL WIRELESS DRIVER
M:      Simon Kelley <simon@thekelleys.org.uk>
L:      linux-wireless@vger.kernel.org
W:      http://www.thekelleys.org.uk/atmel
W:      http://atmelwlandriver.sourceforge.net/
S:      Maintained
F:      drivers/net/wireless/atmel*

AUDIT SUBSYSTEM
M:      Al Viro <viro@zeniv.linux.org.uk>
M:      Eric Paris <eparis@redhat.com>
L:      linux-audit@redhat.com (subscribers-only)
W:      http://people.redhat.com/sgrubb/audit/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/viro/audit-
current.git
S:      Maintained
F:      include/linux/audit.h
F:      include/uapi/linux/audit.h
F:      kernel/audit*

AUXILIARY DISPLAY DRIVERS
M:      Miguel Ojeda Sandonis <miguel.ojeda.sandonis@gmail.com>
W:      http://miguelojeda.es/auxdisplay.htm
W:      http://jair.lab.fi.uva.es/~migojed/auxdisplay.htm
S:      Maintained
F:      drivers/auxdisplay/
F:      include/linux/cfag12864b.h

AVR32 ARCHITECTURE
M:      Haavard Skinnemoen <hskinnemoen@gmail.com>
M:      Hans-Christian Egtvedt <egtvedt@samfundet.no>
```

```
W:      http://www.atmel.com/products/AVR32/
W:      http://mirror.egtvedt.no/avr32linux.org/
W:      http://avrfreaks.net/
S:      Maintained
F:      arch/avr32/

AVR32/AT32AP MACHINE SUPPORT
M:      Haavard Skinnemoen <hskinnemoen@gmail.com>
M:      Hans-Christian Egtvedt <egtvedt@samfundet.no>
S:      Maintained
F:      arch/avr32/mach-at32ap/

AX.25 NETWORK LAYER
M:      Ralf Baechle <ralf@linux-mips.org>
L:      linux-hams@vger.kernel.org
W:      http://www.linux-ax25.org/
S:      Maintained
F:      include/uapi/linux/ax25.h
F:      include/net/ax25.h
F:      net/ax25/

AZ6007 DVB DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/az6007.c

AZTECH FM RADIO RECEIVER DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/radio/radio-aztech*

B43 WIRELESS DRIVER
M:      Stefano Brivio <stefano.brivio@polimi.it>
L:      linux-wireless@vger.kernel.org
L:      b43-dev@lists.infradead.org
W:      http://wireless.kernel.org/en/users/Drivers/b43
S:      Maintained
F:      drivers/net/wireless/b43/

B43LEGACY WIRELESS DRIVER
M:      Larry Finger <Larry.Finger@lwfinger.net>
M:      Stefano Brivio <stefano.brivio@polimi.it>
L:      linux-wireless@vger.kernel.org
L:      b43-dev@lists.infradead.org
W:      http://wireless.kernel.org/en/users/Drivers/b43
S:      Maintained
F:      drivers/net/wireless/b43legacy/

BACKLIGHT CLASS/SUBSYSTEM
M:      Richard Purdie <rpurdie@rpsys.net>
S:      Maintained
```

```
F:      drivers/video/backlight/
F:      include/linux/backlight.h

BATMAN ADVANCED
M:      Marek Lindner <lindner_marek@yahoo.de>
M:      Simon Wunderlich <siwu@hrz.tu-chemnitz.de>
M:      Antonio Quartulli <ordex@autistici.org>
L:      b.a.t.m.a.n@lists.open-mesh.org
W:      http://www.open-mesh.org/
S:      Maintained
F:      net/batman-adv/

BAYCOM/HDLCDRV DRIVERS FOR AX.25
M:      Thomas Sailer <t.sailer@alumni.ethz.ch>
L:      linux-hams@vger.kernel.org
W:      http://www.baycom.org/~tom/ham/ham.html
S:      Maintained
F:      drivers/net/hamradio/baycom*

BCACHE (BLOCK LAYER CACHE)
M:      Kent Overstreet <koverstreet@google.com>
L:      linux-bcache@vger.kernel.org
W:      http://bcache.evilpiepirate.org
S:      Maintained:
F:      drivers/md/bcache/

BEFS FILE SYSTEM
S:      Orphan
F:      Documentation/filesystems/befs.txt
F:      fs/befs/

BFS FILE SYSTEM
M:      "Tigran A. Aivazian" <tigran@aivazian.fsnet.co.uk>
S:      Maintained
F:      Documentation/filesystems/bfs.txt
F:      fs/bfs/
F:      include/uapi/linux/bfs_fs.h

BLACKFIN ARCHITECTURE
M:      Mike Frysinger <vapier@gentoo.org>
L:      uclinux-dist-devel@blackfin.uclinux.org
W:      http://blackfin.uclinux.org
S:      Supported
F:      arch/blackfin/

BLACKFIN EMAC DRIVER
L:      uclinux-dist-devel@blackfin.uclinux.org
W:      http://blackfin.uclinux.org
S:      Supported
F:      drivers/net/ethernet/adi/

BLACKFIN RTC DRIVER
M:      Mike Frysinger <vapier.adi@gmail.com>
L:      uclinux-dist-devel@blackfin.uclinux.org
W:      http://blackfin.uclinux.org
S:      Supported
F:      drivers/rtc/rtc-bfin.c
```

```
BLACKFIN SDH DRIVER
M:      Sonic Zhang <sonic.zhang@analog.com>
L:      uclinux-dist-devel@blackfin.uclinux.org
W:      http://blackfin.uclinux.org
S:      Supported
F:      drivers/mmc/host/bfin_sdh.c

BLACKFIN SERIAL DRIVER
M:      Sonic Zhang <sonic.zhang@analog.com>
L:      uclinux-dist-devel@blackfin.uclinux.org
W:      http://blackfin.uclinux.org
S:      Supported
F:      drivers/tty/serial/bfin_uart.c

BLACKFIN WATCHDOG DRIVER
M:      Mike Frysinger <vapier.adi@gmail.com>
L:      uclinux-dist-devel@blackfin.uclinux.org
W:      http://blackfin.uclinux.org
S:      Supported
F:      drivers/watchdog/bfin_wdt.c

BLACKFIN I2C TWI DRIVER
M:      Sonic Zhang <sonic.zhang@analog.com>
L:      uclinux-dist-devel@blackfin.uclinux.org
W:      http://blackfin.uclinux.org/
S:      Supported
F:      drivers/i2c/busses/i2c-bfin-twi.c

BLACKFIN MEDIA DRIVER
M:      Scott Jiang <scott.jiang.linux@gmail.com>
L:      uclinux-dist-devel@blackfin.uclinux.org
W:      http://blackfin.uclinux.org/
S:      Supported
F:      drivers/media/platform/blackfin/
F:      drivers/media/i2c/adv7183*
F:      drivers/media/i2c/vs6624*

BLINKM RGB LED DRIVER
M:      Jan-Simon Moeller <jansimon.moeller@gmx.de>
S:      Maintained
F:      drivers/leds/leds-blinkm.c

BLOCK LAYER
M:      Jens Axboe <axboe@kernel.dk>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/axboe/linux-
block.git
S:      Maintained
F:      block/

BLOCK2MTD DRIVER
M:      Joern Engel <joern@lazybastard.org>
L:      linux-mtd@lists.infradead.org
S:      Maintained
F:      drivers/mtd/devices/block2mtd.c

BLUETOOTH DRIVERS
```

```
M:      Marcel Holtmann <marcel@holtmann.org>
M:      Gustavo Padovan <gustavo@padovan.org>
M:      Johan Hedberg <johan.hedberg@gmail.com>
L:      linux-bluetooth@vger.kernel.org
W:      http://www.bluez.org/
T:      git
git://git.kernel.org/pub/scm/linux/kernel/git/bluetooth/bluetooth.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/bluetooth/bluetooth-
next.git
S:      Maintained
F:      drivers/bluetooth/

BLUETOOTH SUBSYSTEM
M:      Marcel Holtmann <marcel@holtmann.org>
M:      Gustavo Padovan <gustavo@padovan.org>
M:      Johan Hedberg <johan.hedberg@gmail.com>
L:      linux-bluetooth@vger.kernel.org
W:      http://www.bluez.org/
T:      git
git://git.kernel.org/pub/scm/linux/kernel/git/bluetooth/bluetooth.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/bluetooth/bluetooth-
next.git
S:      Maintained
F:      net/bluetooth/
F:      include/net/bluetooth/

BONDING DRIVER
M:      Jay Vosburgh <fubar@us.ibm.com>
M:      Andy Gospodarek <andy@greyhouse.net>
L:      netdev@vger.kernel.org
W:      http://sourceforge.net/projects/bonding/
S:      Supported
F:      drivers/net/bonding/
F:      include/uapi/linux/if_bonding.h

BROADCOM B44 10/100 ETHERNET DRIVER
M:      Gary Zambrano <zambrano@broadcom.com>
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/broadcom/b44.*

BROADCOM BNX2 GIGABIT ETHERNET DRIVER
M:      Michael Chan <mchan@broadcom.com>
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/broadcom/bnx2.*
F:      drivers/net/ethernet/broadcom/bnx2_*

BROADCOM BNX2X 10 GIGABIT ETHERNET DRIVER
M:      Eilon Greenstein <eilong@broadcom.com>
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/broadcom/bnx2x/

BROADCOM BCM2835 ARM ARCHICTURE
M:      Stephen Warren <swarren@wwwdotorg.org>
L:      linux-rpi-kernel@lists.infradead.org (moderated for non-subscribers)
```

```
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/swarren/linux-
rpi.git
S:      Maintained
F:      arch/arm/mach-bcm2835/
F:      arch/arm/boot/dts/bcm2835*
F:      arch/arm/configs/bcm2835_defconfig
F:      drivers/*/*bcm2835*

BROADCOM TG3 GIGABIT ETHERNET DRIVER
M:      Nithin Nayak Sujir <nsujir@broadcom.com>
M:      Michael Chan <mchan@broadcom.com>
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/broadcom/tg3.*

BROADCOM BRCM80211 IEEE802.11n WIRELESS DRIVER
M:      Brett Rudley <brudley@broadcom.com>
M:      Arend van Spriel <arend@broadcom.com>
M:      Franky (Zhenhui) Lin <frankyl@broadcom.com>
M:      Hante Meuleman <meuleman@broadcom.com>
L:      linux-wireless@vger.kernel.org
L:      brcm80211-dev-list@broadcom.com
S:      Supported
F:      drivers/net/wireless/brcm80211/

BROADCOM BNX2FC 10 GIGABIT FCOE DRIVER
M:      Bhanu Prakash Gollapudi <bprakash@broadcom.com>
L:      linux-scsi@vger.kernel.org
S:      Supported
F:      drivers/scsi/bnx2fc/

BROADCOM SPECIFIC AMBA DRIVER (BCMA)
M:      Rafał Miłecki <zajec5@gmail.com>
L:      linux-wireless@vger.kernel.org
S:      Maintained
F:      drivers/bcma/
F:      include/linux/bcma/

BROCADE BFA FC SCSI DRIVER
M:      Anil Gurumurthy <agurumur@brocade.com>
M:      Vijaya Mohan Guvva <vmohan@brocade.com>
L:      linux-scsi@vger.kernel.org
S:      Supported
F:      drivers/scsi/bfa/

BROCADE BNA 10 GIGABIT ETHERNET DRIVER
M:      Rasesh Mody <rmody@brocade.com>
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/brocade/bna/

BSG (block layer generic sg v4 driver)
M:      FUJITA Tomonori <fujita.tomonori@lab.ntt.co.jp>
L:      linux-scsi@vger.kernel.org
S:      Supported
F:      block/bsg.c
F:      include/linux/bsg.h
```

```
F:      include/uapi/linux/bsg.h

BT87X AUDIO DRIVER
M:      Clemens Ladisch <clemens@ladisch.de>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
T:      git git://git.alsa-project.org/alsa-kernel.git
S:      Maintained
F:      Documentation/sound/alsa/Bt87x.txt
F:      sound/pci/bt87x.c

BT8XXGPIO DRIVER
M:      Michael Buesch <m@bues.ch>
W:      http://bu3sch.de/btgpio.php
S:      Maintained
F:      drivers/gpio/gpio-bt8xx.c

BTRFS FILE SYSTEM
M:      Chris Mason <chris.mason@fusionio.com>
L:      linux-btrfs@vger.kernel.org
W:      http://btrfs.wiki.kernel.org/
Q:      http://patchwork.kernel.org/project/linux-btrfs/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/mason/linux-
btrfs.git
S:      Maintained
F:      Documentation/filesystems/btrfs.txt
F:      fs/btrfs/

BTTV VIDEO4LINUX DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Odd fixes
F:      Documentation/video4linux/bttv/
F:      drivers/media/pci/bt8xx/bttv*

C-MEDIA CMI8788 DRIVER
M:      Clemens Ladisch <clemens@ladisch.de>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
T:      git git://git.alsa-project.org/alsa-kernel.git
S:      Maintained
F:      sound/pci/oxygen/

C6X ARCHITECTURE
M:      Mark Salter <msalter@redhat.com>
M:      Aurelien Jacquiot <a-jacquiot@ti.com>
L:      linux-c6x-dev@linux-c6x.org
W:      http://www.linux-c6x.org/wiki/index.php/Main_Page
S:      Maintained
F:      arch/c6x/

CACHEFILES: FS-CACHE BACKEND FOR CACHING ON MOUNTED FILESYSTEMS
M:      David Howells <dhowells@redhat.com>
L:      linux-cachefs@redhat.com
S:      Supported
F:      Documentation/filesystems/caching/cachefiles.txt
F:      fs/cachefiles/
```

```
CADET FM/AM RADIO RECEIVER DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/radio/radio-cadet*

CAFE CMOS INTEGRATED CAMERA CONTROLLER DRIVER
M:      Jonathan Corbet <corbet@lwn.net>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      Documentation/video4linux/cafe_ccic
F:      drivers/media/platform/marvell-ccic/

CAIF NETWORK LAYER
M:      Dmitry Tarnyagin <dmitry.tarnyagin@lockless.no>
L:      netdev@vger.kernel.org
S:      Supported
F:      Documentation/networking/caif/
F:      drivers/net/caif/
F:      include/uapi/linux/caif/
F:      include/net/caif/
F:      net/caif/

CALGARY x86-64 IOMMU
M:      Muli Ben-Yehuda <muli@il.ibm.com>
M:      "Jon D. Mason" <jdmason@kudzu.us>
L:      discuss@x86-64.org
S:      Maintained
F:      arch/x86/kernel/pci-calgary_64.c
F:      arch/x86/kernel/tce_64.c
F:      arch/x86/include/asm/calgary.h
F:      arch/x86/include/asm/tce.h

CAN NETWORK LAYER
M:      Oliver Hartkopp <socketcan@hartkopp.net>
L:      linux-can@vger.kernel.org
W:      http://gitorious.org/linux-can
T:      git git://gitorious.org/linux-can/linux-can-next.git
S:      Maintained
F:      net/can/
F:      include/linux/can/core.h
F:      include/uapi/linux/can.h
F:      include/uapi/linux/can/bcm.h
F:      include/uapi/linux/can/raw.h
F:      include/uapi/linux/can/gw.h

CAN NETWORK DRIVERS
M:      Wolfgang Grandegger <wg@grandegger.com>
M:      Marc Kleine-Budde <mkl@pengutronix.de>
L:      linux-can@vger.kernel.org
W:      http://gitorious.org/linux-can
T:      git git://gitorious.org/linux-can/linux-can-next.git
S:      Maintained
```

```
F:      drivers/net/can/
F:      include/linux/can/dev.h
F:      include/linux/can/platform/
F:      include/uapi/linux/can/error.h
F:      include/uapi/linux/can/netlink.h

CAPABILITIES
M:      Serge Hallyn <serge.hallyn@canonical.com>
L:      linux-security-module@vger.kernel.org
S:      Supported
F:      include/linux/capability.h
F:      include/uapi/linux/capability.h
F:      security/capability.c
F:      security/commoncap.c
F:      kernel/capability.c

CELL BROADBAND ENGINE ARCHITECTURE
M:      Arnd Bergmann <arnd@arndb.de>
L:      linuxppc-dev@lists.ozlabs.org
L:      cbe-oss-dev@lists.ozlabs.org
W:      http://www.ibm.com/developerworks/power/cell/
S:      Supported
F:      arch/powerpc/include/asm/cell*.h
F:      arch/powerpc/include/asm/spu*.h
F:      arch/powerpc/include/uapi/asm/spu*.h
F:      arch/powerpc/oprofile/*cell*
F:      arch/powerpc/platforms/cell/

CEPH DISTRIBUTED FILE SYSTEM CLIENT
M:      Sage Weil <sage@inktank.com>
L:      ceph-devel@vger.kernel.org
W:      http://ceph.com/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/sage/ceph-client.git
S:      Supported
F:      Documentation/filesystems/ceph.txt
F:      fs/ceph
F:      net/ceph
F:      include/linux/ceph
F:      include/linux/crush

CERTIFIED WIRELESS USB (WUSB) SUBSYSTEM:
L:      linux-usb@vger.kernel.org
S:      Orphan
F:      Documentation/usb/WUSB-Design-overview.txt
F:      Documentation/usb/wusb-cbaf
F:      drivers/usb/host/hwa-hc.c
F:      drivers/usb/host/whci/
F:      drivers/usb/wusbcore/
F:      include/linux/usb/wusb*

CFAG12864B LCD DRIVER
M:      Miguel Ojeda Sandonis <miguel.ojeda.sandonis@gmail.com>
W:      http://miguelojeda.es/auxdisplay.htm
W:      http://jair.lab.fi.uva.es/~migojed/auxdisplay.htm
S:      Maintained
F:      drivers/auxdisplay/cfag12864b.c
F:      include/linux/cfag12864b.h
```

```
CFAG12864BFB LCD FRAMEBUFFER DRIVER
M:      Miguel Ojeda Sandonis <miguel.ojeda.sandonis@gmail.com>
W:      http://miguelojeda.es/auxdisplay.htm
W:      http://jair.lab.fi.uva.es/~migojed/auxdisplay.htm
S:      Maintained
F:      drivers/auxdisplay/cfag12864bfb.c
F:      include/linux/cfag12864b.h

CFG80211 and NL80211
M:      Johannes Berg <johannes@sipsolutions.net>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jberg/mac80211.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jberg/mac80211-
next.git
S:      Maintained
F:      include/uapi/linux/nl80211.h
F:      include/net/cfg80211.h
F:      net/wireless/*
X:      net/wireless/wext*

CHAR and MISC DRIVERS
M:      Arnd Bergmann <arnd@arndb.de>
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/gregkh/char-misc.git
S:      Supported
F:      drivers/char/*
F:      drivers/misc/*

CHECKPATCH
M:      Andy Whitcroft <apw@canonical.com>
M:      Joe Perches <joe@perches.com>
S:      Maintained
F:      scripts/checkpatch.pl

CHINESE DOCUMENTATION
M:      Harry Wei <harryxiyou@gmail.com>
L:      xiyoulinuxkernelgroup@googlegroups.com (subscribers-only)
L:      linux-kernel@zh-kernel.org (moderated for non-subscribers)
S:      Maintained
F:      Documentation/zh_CN/

CHIPIDEA USB HIGH SPEED DUAL ROLE CONTROLLER
M:      Alexander Shishkin <alexander.shishkin@linux.intel.com>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/chipidea/

CISCO VIC ETHERNET NIC DRIVER
M:      Christian Benvenuti <benve@cisco.com>
M:      Roopa Prabhu <roprabhu@cisco.com>
M:      Neel Patel <neepatel@cisco.com>
M:      Nishank Trivedi <nistrive@cisco.com>
S:      Supported
F:      drivers/net/ethernet/cisco/enic/
```

```
CIRRUS LOGIC EP93XX ETHERNET DRIVER
M:      Hartley Sweeten <hsweeten@visionengravers.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/cirrus/ep93xx_eth.c

CIRRUS LOGIC EP93XX OHCI USB HOST DRIVER
M:      Lennert Buytenhek <kernel@wantstofly.org>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/host/ohci-ep93xx.c

CIRRUS LOGIC CS4270 SOUND DRIVER
M:      Timur Tabi <timur@tabi.org>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
S:      Odd Fixes
F:      sound/soc/codecs/cs4270*

CLEANCACHE API
M:      Konrad Rzeszutek Wilk <konrad.wilk@oracle.com>
L:      linux-kernel@vger.kernel.org
S:      Maintained
F:      mm/cleancache.c
F:      include/linux/cleancache.h

CLK API
M:      Russell King <linux@arm.linux.org.uk>
S:      Maintained
F:      include/linux/clk.h

CISCO FCOE HBA DRIVER
M:      Hiral Patel <hiralpat@cisco.com>
M:      Suma Ramars <sramars@cisco.com>
M:      Brian Uchino <buchino@cisco.com>
L:      linux-scsi@vger.kernel.org
S:      Supported
F:      drivers/scsi/fnic/

CMPC ACPI DRIVER
M:      Thadeu Lima de Souza Cascardo <cascardo@holoscopio.com>
M:      Daniel Oliveira Nascimento <don@syst.com.br>
L:      platform-driver-x86@vger.kernel.org
S:      Supported
F:      drivers/platform/x86/classmate-laptop.c

COCCINELLE/Semantic Patches (SmPL)
M:      Julia Lawall <Julia.Lawall@lip6.fr>
M:      Gilles Muller <Gilles.Muller@lip6.fr>
M:      Nicolas Palix <nicolas.palix@imag.fr>
L:      cocci@systeme.lip6.fr (moderated for non-subscribers)
W:      http://coccinelle.lip6.fr/
S:      Supported
F:      scripts/coccinelle/
F:      scripts/coccicheck

CODA FILE SYSTEM
M:      Jan Harkes <jaharkes@cs.cmu.edu>
```

```
M:      coda@cs.cmu.edu
L:      codalist@coda.cs.cmu.edu
W:      http://www.coda.cs.cmu.edu/
S:      Maintained
F:      Documentation/filesystems/coda.txt
F:      fs/coda/
F:      include/linux/coda*.h
F:      include/uapi/linux/coda*.h

COMMON CLK FRAMEWORK
M:      Mike Turquette <mturquette@linaro.org>
L:      linux-arm-kernel@lists.infradead.org (same as CLK API & CLKDEV)
T:      git git://git.linaro.org/people/mturquette/linux.git
S:      Maintained
F:      drivers/clk/clk.c
F:      drivers/clk/clk-*
F:      include/linux/clk-pr*

COMMON INTERNET FILE SYSTEM (CIFS)
M:      Steve French <sfrench@samba.org>
L:      linux-cifs@vger.kernel.org
L:      samba-technical@lists.samba.org (moderated for non-subscribers)
W:      http://linux-cifs.samba.org/
Q:      http://patchwork.ozlabs.org/project/linux-cifs-client/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/sfrench/cifs-2.6.git
S:      Supported
F:      Documentation/filesystems/cifs.txt
F:      fs/cifs/

COMPACTPCI HOTPLUG CORE
M:      Scott Murray <scott@spiteful.org>
L:      linux-pci@vger.kernel.org
S:      Maintained
F:      drivers/pci/hotplug/cpci_hotplug*

COMPACTPCI HOTPLUG ZIATECH ZT5550 DRIVER
M:      Scott Murray <scott@spiteful.org>
L:      linux-pci@vger.kernel.org
S:      Maintained
F:      drivers/pci/hotplug/cpcihp_zt5550.*

COMPACTPCI HOTPLUG GENERIC DRIVER
M:      Scott Murray <scott@spiteful.org>
L:      linux-pci@vger.kernel.org
S:      Maintained
F:      drivers/pci/hotplug/cpcihp_generic.c

COMPAL LAPTOP SUPPORT
M:      Cezary Jackiewicz <cezary.jackiewicz@gmail.com>
L:      platform-driver-x86@vger.kernel.org
S:      Maintained
F:      drivers/platform/x86/compal-laptop.c

CONEXANT ACCESSRUNNER USB DRIVER
M:      Simon Arlott <cxacru@fire.lp0.eu>
L:      accessrunner-general@lists.sourceforge.net
W:      http://accessrunner.sourceforge.net/
```

```
S:      Maintained
F:      drivers/usb/atm/cxacru.c

CONFIGFS
M:      Joel Becker <jlbec@evilplan.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jlbec/configfs.git
S:      Supported
F:      fs/configfs/
F:      include/linux/configfs.h

CONNECTOR
M:      Evgeniy Polyakov <zbr@ioremap.net>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/connector/

CONTROL GROUPS (CGROUPS)
M:      Tejun Heo <tj@kernel.org>
M:      Li Zefan <lizefan@huawei.com>
L:      containers@lists.linux-foundation.org
L:      cgroups@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tj/cgroup.git
S:      Maintained
F:      include/linux/cgroup*
F:      kernel/cgroup*
F:      mm/*cgroup*

CORETEMP HARDWARE MONITORING DRIVER
M:      Fenghua Yu <fenghua.yu@intel.com>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/coretemp
F:      drivers/hwmon/coretemp.c

COSA/SRP SYNC SERIAL DRIVER
M:      Jan "Yenya" Kasprzak <kas@fi.muni.cz>
W:      http://www.fi.muni.cz/~kas/cosa/
S:      Maintained
F:      drivers/net/wan/cosa*

CPMAC ETHERNET DRIVER
M:      Florian Fainelli <florian@openwrt.org>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/ti/cpmac.c

CPU FREQUENCY DRIVERS
M:      Rafael J. Wysocki <rjw@sisk.pl>
M:      Viresh Kumar <viresh.kumar@linaro.org>
L:      cpufreq@vger.kernel.org
L:      linux-pm@vger.kernel.org
S:      Maintained
T:      git://git.kernel.org/pub/scm/linux/kernel/git/rafael/linux-pm.git
F:      drivers/cpufreq/
F:      include/linux/cpufreq.h

CPU FREQUENCY DRIVERS - ARM BIG LITTLE
```

```
M:      Viresh Kumar <viresh.kumar@linaro.org>
M:      Sudeep KarkadaNagesha <sudeep.karkadanagesha@arm.com>
L:      cpufreq@vger.kernel.org
L:      linux-pm@vger.kernel.org
W:
        http://www.arm.com/products/processors/technologies/biglittleprocessin
g.php
S:      Maintained
F:      drivers/cpufreq/arm_big_little.h
F:      drivers/cpufreq/arm_big_little.c
F:      drivers/cpufreq/arm_big_little_dt.c

CPUIDLE DRIVERS
M:      Rafael J. Wysocki <rjw@sisk.pl>
M:      Daniel Lezcano <daniel.lezcano@linaro.org>
L:      linux-pm@vger.kernel.org
S:      Maintained
T:      git://git.kernel.org/pub/scm/linux/kernel/git/rafael/linux-pm.git
F:      drivers/cpuidle/*
F:      include/linux/cpuidle.h

CPUID/MSR DRIVER
M:      "H. Peter Anvin" <hpa@zytor.com>
S:      Maintained
F:      arch/x86/kernel/cpuid.c
F:      arch/x86/kernel/msr.c

CPU POWER MONITORING SUBSYSTEM
M:      Dominik Brodowski <linux@dominikbrodowski.net>
M:      Thomas Renninger <trenn@suse.de>
S:      Maintained
F:      tools/power/cpupower

CPUSETS
M:      Li Zefan <lizefan@huawei.com>
W:      http://www.bullopensource.org/cpuset/
W:      http://oss.sgi.com/projects/cpusets/
S:      Maintained
F:      Documentation/cgroups/cpusets.txt
F:      include/linux/cpuset.h
F:      kernel/cpuset.c

CRAMFS FILESYSTEM
W:      http://sourceforge.net/projects/cramfs/
S:      Orphan
F:      Documentation/filesystems/cramfs.txt
F:      fs/cramfs/

CRIS PORT
M:      Mikael Starvik <starvik@axis.com>
M:      Jesper Nilsson <jesper.nilsson@axis.com>
L:      linux-cris-kernel@axis.com
W:      http://developer.axis.com
S:      Maintained
F:      arch/cris/
F:      drivers/tty/serial/crisv10.*
```

```
CRYPTO API
M:      Herbert Xu <herbert@gondor.apana.org.au>
M:      "David S. Miller" <davem@davemloft.net>
L:      linux-crypto@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/herbert/crypto-
2.6.git
S:      Maintained
F:      Documentation/crypto/
F:      arch/*/crypto/
F:      crypto/
F:      drivers/crypto/
F:      include/crypto/

CRYPTOGRAPHIC RANDOM NUMBER GENERATOR
M:      Neil Horman <nhorman@tuxdriver.com>
L:      linux-crypto@vger.kernel.org
S:      Maintained
F:      crypto/ansi_cprng.c
F:      crypto/rng.c

CS5535 Audio ALSA driver
M:      Jaya Kumar <jayakumar.alsa@gmail.com>
S:      Maintained
F:      sound/pci/cs5535audio/

CW1200 WLAN driver
M:     Solomon Peachy <pizza@shaftnet.org>
S:     Maintained
F:     drivers/net/wireless/cw1200/

CX18 VIDEO4LINUX DRIVER
M:      Andy Walls <awalls@md.metrocast.net>
L:      ivtv-devel@ivtvdriver.org (moderated for non-subscribers)
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
W:      http://www.ivtvdriver.org/index.php/Cx18
S:      Maintained
F:      Documentation/video4linux/cx18.txt
F:      drivers/media/pci/cx18/
F:      include/uapi/linux/ivtv*

CX2341X MPEG ENCODER HELPER MODULE
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/common/cx2341x*
F:      include/media/cx2341x*

CX88 VIDEO4LINUX DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Odd fixes
```

```
F:      Documentation/video4linux/cx88/
F:      drivers/media/pci/cx88/

CXD2820R MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/dvb-frontends/cxd2820r*

CXGB3 ETHERNET DRIVER (CXGB3)
M:      Divy Le Ray <divy@chelsio.com>
L:      netdev@vger.kernel.org
W:      http://www.chelsio.com
S:      Supported
F:      drivers/net/ethernet/chelsio/cxgb3/

CXGB3 IWARP RNIC DRIVER (IW_CXGB3)
M:      Steve Wise <swise@chelsio.com>
L:      linux-rdma@vger.kernel.org
W:      http://www.openfabrics.org
S:      Supported
F:      drivers/infiniband/hw/cxgb3/

CXGB4 ETHERNET DRIVER (CXGB4)
M:      Dimitris Michailidis <dm@chelsio.com>
L:      netdev@vger.kernel.org
W:      http://www.chelsio.com
S:      Supported
F:      drivers/net/ethernet/chelsio/cxgb4/

CXGB4 IWARP RNIC DRIVER (IW_CXGB4)
M:      Steve Wise <swise@chelsio.com>
L:      linux-rdma@vger.kernel.org
W:      http://www.openfabrics.org
S:      Supported
F:      drivers/infiniband/hw/cxgb4/

CXGB4VF ETHERNET DRIVER (CXGB4VF)
M:      Casey Leedom <leedom@chelsio.com>
L:      netdev@vger.kernel.org
W:      http://www.chelsio.com
S:      Supported
F:      drivers/net/ethernet/chelsio/cxgb4vf/

STMMAC ETHERNET DRIVER
M:      Giuseppe Cavallaro <peppe.cavallaro@st.com>
L:      netdev@vger.kernel.org
W:      http://www.stlinux.com
S:      Supported
F:      drivers/net/ethernet/stmicro/stmmac/

CYBERPRO FB DRIVER
M:      Russell King <linux@arm.linux.org.uk>
```

```
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.arm.linux.org.uk/
S:      Maintained
F:      drivers/video/cyber2000fb.*

CYCLADES ASYNC MUX DRIVER
W:      http://www.cyclades.com/
S:      Orphan
F:      drivers/tty/cyclades.c
F:      include/linux/cyclades.h
F:      include/uapi/linux/cyclades.h

CYCLADES PC300 DRIVER
W:      http://www.cyclades.com/
S:      Orphan
F:      drivers/net/wan/pc300*

CYPRESS_FIRMWARE MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/common/cypress_firmware*

CYTTSP TOUCHSCREEN DRIVER
M:      Javier Martinez Canillas <javier@dowhile0.org>
L:      linux-input@vger.kernel.org
S:      Maintained
F:      drivers/input/touchscreen/cyttsp*
F:      include/linux/input/cyttsp.h

DAMA SLAVE for AX.25
M:      Joerg Reuter <jreuter@yaina.de>
W:      http://yaina.de/jreuter/
W:      http://www.qsl.net/dl1bke/
L:      linux-hams@vger.kernel.org
S:      Maintained
F:      net/ax25/af_ax25.c
F:      net/ax25/ax25_dev.c
F:      net/ax25/ax25_ds_*
F:      net/ax25/ax25_in.c
F:      net/ax25/ax25_out.c
F:      net/ax25/ax25_timer.c
F:      net/ax25/sysctl_net_ax25.c

DAVICOM FAST ETHERNET (DMFE) NETWORK DRIVER
L:      netdev@vger.kernel.org
S:      Orphan
F:      Documentation/networking/dmfe.txt
F:      drivers/net/ethernet/dec/tulip/dmfe.c

DC390/AM53C974 SCSI driver
M:      Kurt Garloff <garloff@suse.de>
W:      http://www.garloff.de/kurt/linux/dc390/
```

```
M:      Guennadi Liakhovetski <g.liakhovetski@gmx.de>
S:      Maintained
F:      drivers/scsi/tmscsim.*

DC395x SCSI driver
M:      Oliver Neukum <oliver@neukum.org>
M:      Ali Akcaagac <aliakc@web.de>
M:      Jamie Lenehan <lenehan@twibble.org>
W:      http://twibble.org/dist/dc395x/
L:      dc395x@twibble.org
L:      http://lists.twibble.org/mailman/listinfo/dc395x/
S:      Maintained
F:      Documentation/scsi/dc395x.txt
F:      drivers/scsi/dc395x.*

DCCP PROTOCOL
M:      Gerrit Renker <gerrit@erg.abdn.ac.uk>
L:      dccp@vger.kernel.org
W:      http://www.linuxfoundation.org/collaborate/workgroups/networking/dccp
S:      Maintained
F:      include/linux/dccp.h
F:      include/uapi/linux/dccp.h
F:      include/linux/tfrc.h
F:      net/dccp/

DECnet NETWORK LAYER
W:      http://linux-decnet.sourceforge.net
L:      linux-decnet-user@lists.sourceforge.net
S:      Orphan
F:      Documentation/networking/decnet.txt
F:      net/decnet/

DEFXX FDDI NETWORK DRIVER
M:      "Maciej W. Rozycki" <macro@linux-mips.org>
S:      Maintained
F:      drivers/net/fddi/defxx.*

DELL LAPTOP DRIVER
M:      Matthew Garrett <mjg59@srcf.ucam.org>
L:      platform-driver-x86@vger.kernel.org
S:      Maintained
F:      drivers/platform/x86/dell-laptop.c

DELL LAPTOP SMM DRIVER
S:      Orphan
F:      drivers/char/i8k.c
F:      include/uapi/linux/i8k.h

DELL SYSTEMS MANAGEMENT BASE DRIVER (dcdbas)
M:      Doug Warzecha <Douglas_Warzecha@dell.com>
S:      Maintained
F:      Documentation/dcdbas.txt
F:      drivers/firmware/dcdbas.*

DELL WMI EXTRAS DRIVER
M:      Matthew Garrett <mjg59@srcf.ucam.org>
S:      Maintained
```

```
F:      drivers/platform/x86/dell-wmi.c

DESIGNWARE USB2 DRD IP DRIVER
M:      Paul Zimmerman <paulz@synopsys.com>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/staging/dwc2/

DESIGNWARE USB3 DRD IP DRIVER
M:      Felipe Balbi <balbi@ti.com>
L:      linux-usb@vger.kernel.org
L:      linux-omap@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/balbi/usb.git
S:      Maintained
F:      drivers/usb/dwc3/

DEVICE FREQUENCY (DEVFREQ)
M:      MyungJoo Ham <myungjoo.ham@samsung.com>
M:      Kyungmin Park <kyungmin.park@samsung.com>
L:      linux-kernel@vger.kernel.org
S:      Maintained
F:      drivers/devfreq/

DEVICE NUMBER REGISTRY
M:      Torben Mathiasen <device@lanana.org>
W:      http://lanana.org/docs/device-list/index.html
S:      Maintained

DEVICE-MAPPER  (LVM)
M:      Alasdair Kergon <agk@redhat.com>
M:      dm-devel@redhat.com
L:      dm-devel@redhat.com
W:      http://sources.redhat.com/dm
Q:      http://patchwork.kernel.org/project/dm-devel/list/
T:      quilt http://people.redhat.com/agk/patches/linux/editing/
S:      Maintained
F:      Documentation/device-mapper/
F:      drivers/md/dm*
F:      drivers/md/persistent-data/
F:      include/linux/device-mapper.h
F:      include/linux/dm-*.h

DIOLAN U2C-12 I2C DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      drivers/i2c/busses/i2c-diolan-u2c.c

DIRECTORY NOTIFICATION (DNOTIFY)
M:      Eric Paris <eparis@parisplace.org>
S:      Maintained
F:      Documentation/filesystems/dnotify.txt
F:      fs/notify/dnotify/
F:      include/linux/dnotify.h

DISK GEOMETRY AND PARTITION HANDLING
M:      Andries Brouwer <aeb@cwi.nl>
```

```
W:      http://www.win.tue.nl/~aeb/linux/Large-Disk.html
W:      http://www.win.tue.nl/~aeb/linux/zip/zip-1.html
W:      http://www.win.tue.nl/~aeb/partitions/partition_types-1.html
S:      Maintained

DISKQUOTA
M:      Jan Kara <jack@suse.cz>
S:      Maintained
F:      Documentation/filesystems/quota.txt
F:      fs/quota/
F:      include/linux/quota*.h
F:      include/uapi/linux/quota*.h

DISPLAYLINK USB 2.0 FRAMEBUFFER DRIVER (UDLFB)
M:      Bernie Thompson <bernie@plugable.com>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
W:      http://plugable.com/category/projects/udlfb/
F:      drivers/video/udlfb.c
F:      include/video/udlfb.h
F:      Documentation/fb/udlfb.txt

DISTRIBUTED LOCK MANAGER (DLM)
M:      Christine Caulfield <ccaulfie@redhat.com>
M:      David Teigland <teigland@redhat.com>
L:      cluster-devel@redhat.com
W:      http://sources.redhat.com/cluster/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/teigland/dlm.git
S:      Supported
F:      fs/dlm/

DMA BUFFER SHARING FRAMEWORK
M:      Sumit Semwal <sumit.semwal@linaro.org>
S:      Maintained
L:      linux-media@vger.kernel.org
L:      dri-devel@lists.freedesktop.org
L:      linaro-mm-sig@lists.linaro.org
F:      drivers/base/dma-buf*
F:      include/linux/dma-buf*
F:      Documentation/dma-buf-sharing.txt
T:      git git://git.linaro.org/people/sumitsemwal/linux-dma-buf.git

DMA GENERIC OFFLOAD ENGINE SUBSYSTEM
M:      Vinod Koul <vinod.koul@intel.com>
M:      Dan Williams <djbw@fb.com>
S:      Supported
F:      drivers/dma/
F:      include/linux/dma*
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/djbw/async_tx.git
T:      git git://git.infradead.org/users/vkoul/slave-dma.git (slave-dma)

DME1737 HARDWARE MONITOR DRIVER
M:      Juerg Haefliger <juergh@gmail.com>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/dme1737
F:      drivers/hwmon/dme1737.c
```

```
DOCKING STATION DRIVER
M:      Shaohua Li <shaohua.li@intel.com>
L:      linux-acpi@vger.kernel.org
S:      Supported
F:      drivers/acpi/dock.c

DOCUMENTATION
M:      Rob Landley <rob@landley.net>
L:      linux-doc@vger.kernel.org
T:      TBD
S:      Maintained
F:      Documentation/

DOUBLETALK DRIVER
M:      "James R. Van Zandt" <jrv@vanzandt.mv.com>
L:      blinux-list@redhat.com
S:      Maintained
F:      drivers/char/dtlk.c
F:      include/linux/dtlk.h

DPT_I2O SCSI RAID DRIVER
M:      Adaptec OEM Raid Solutions <aacraid@adaptec.com>
L:      linux-scsi@vger.kernel.org
W:      http://www.adaptec.com/
S:      Maintained
F:      drivers/scsi/dpt*
F:      drivers/scsi/dpt/

DRBD DRIVER
P:      Philipp Reisner
P:      Lars Ellenberg
M:      drbd-dev@lists.linbit.com
L:      drbd-user@lists.linbit.com
W:      http://www.drbd.org
T:      git git://git.drbd.org/linux-2.6-drbd.git drbd
T:      git git://git.drbd.org/drbd-8.3.git
S:      Supported
F:      drivers/block/drbd/
F:      lib/lru_cache.c
F:      Documentation/blockdev/drbd/

DRIVER CORE, KOBJECTS, DEBUGFS AND SYSFS
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/gregkh/driver-
core.git
S:      Supported
F:      Documentation/kobject.txt
F:      drivers/base/
F:      fs/sysfs/
F:      fs/debugfs/
F:      include/linux/kobj*
F:      include/linux/debugfs.h
F:      lib/kobj*

DRM DRIVERS
M:      David Airlie <airlied@linux.ie>
```

```
L:      dri-devel@lists.freedesktop.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/airlied/drm-2.6.git
S:      Maintained
F:      drivers/gpu/drm/
F:      include/drm/
F:      include/uapi/drm/

INTEL DRM DRIVERS (excluding Poulsbo, Moorestown and derivative chipsets)
M:      Daniel Vetter <daniel.vetter@ffwll.ch>
L:      intel-gfx@lists.freedesktop.org
L:      dri-devel@lists.freedesktop.org
T:      git git://people.freedesktop.org/~danvet/drm-intel
S:      Supported
F:      drivers/gpu/drm/i915
F:      include/drm/i915*
F:      include/uapi/drm/i915*

DRM DRIVERS FOR EXYNOS
M:      Inki Dae <inki.dae@samsung.com>
M:      Joonyoung Shim <jy0922.shim@samsung.com>
M:      Seung-Woo Kim <sw0312.kim@samsung.com>
M:      Kyungmin Park <kyungmin.park@samsung.com>
L:      dri-devel@lists.freedesktop.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/daeinki/drm-
exynos.git
S:      Supported
F:      drivers/gpu/drm/exynos
F:      include/drm/exynos*
F:      include/uapi/drm/exynos*

DRM DRIVERS FOR NVIDIA TEGRA
M:      Thierry Reding <thierry.reding@avionic-design.de>
L:      dri-devel@lists.freedesktop.org
L:      linux-tegra@vger.kernel.org
T:      git git://gitorious.org/thierryreding/linux.git
S:      Maintained
F:      drivers/gpu/drm/tegra/
F:      Documentation/devicetree/bindings/gpu/nvidia,tegra20-host1x.txt

DSBR100 USB FM RADIO DRIVER
M:      Alexey Klimov <klimov.linux@gmail.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/radio/dsbr100.c

DSCC4 DRIVER
M:      Francois Romieu <romieu@fr.zoreil.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/wan/dscc4.c

DVB_USB_AF9015 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
```

```
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/af9015*

DVB_USB_AF9035 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/af9035*

DVB_USB_ANYSEE MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/anysee*

DVB_USB_AU6610 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/au6610*

DVB_USB_CE6230 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/ce6230*

DVB_USB_CXUSB MEDIA DRIVER
M:      Michael Krufky <mkrufky@linuxtv.org>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://github.com/mkrufky
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb/cxusb*

DVB_USB_EC168 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
```

```
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/ec168*

DVB_USB_GL861 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/gl861*

DVB_USB_MXL111SF MEDIA DRIVER
M:      Michael Krufky <mkrufky@linuxtv.org>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://github.com/mkrufky
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/mkrufky/mxl111sf.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/mxl111sf*

DVB_USB_RTL28XXU MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/rtl28xxu*

DVB_USB_V2 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/dvb_usb*
F:      drivers/media/usb/dvb-usb-v2/usb_urb.c

DYNAMIC DEBUG
M:      Jason Baron <jbaron@redhat.com>
S:      Maintained
F:      lib/dynamic_debug.c
F:      include/linux/dynamic_debug.h

DZ DECSTATION DZ11 SERIAL DRIVER
M:      "Maciej W. Rozycki" <macro@linux-mips.org>
S:      Maintained
```

```
F:      drivers/tty/serial/dz.*

E4000 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/tuners/e4000*

EATA-DMA SCSI DRIVER
M:      Michael Neuffer <mike@i-Connect.Net>
L:      linux-eata@i-connect.net
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/eata*

EATA ISA/EISA/PCI SCSI DRIVER
M:      Dario Ballabio <ballabio_dario@emc.com>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/eata.c

EATA-PIO SCSI DRIVER
M:      Michael Neuffer <mike@i-Connect.Net>
L:      linux-eata@i-connect.net
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/eata_pio.*

EBTABLES
M:      Bart De Schuymer <bart.de.schuymer@pandora.be>
L:      netfilter-devel@vger.kernel.org
W:      http://ebtables.sourceforge.net/
S:      Maintained
F:      include/linux/netfilter_bridge/ebt_*.h
F:      include/uapi/linux/netfilter_bridge/ebt_*.h
F:      net/bridge/netfilter/ebt*.c

EC100 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/dvb-frontends/ec100*

ECRYPT FILE SYSTEM
M:      Tyler Hicks <tyhicks@canonical.com>
L:      ecryptfs@vger.kernel.org
W:      http://ecryptfs.org
W:      https://launchpad.net/ecryptfs
S:      Supported
```

```
F:      Documentation/filesystems/ecryptfs.txt
F:      fs/ecryptfs/

EDAC-CORE
M:      Doug Thompson <dougthompson@xmission.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Supported
F:      Documentation/edac.txt
F:      drivers/edac/
F:      include/linux/edac.h

EDAC-AMD64
M:      Doug Thompson <dougthompson@xmission.com>
M:      Borislav Petkov <bp@alien8.de>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/amd64_edac*

EDAC-CAVIUM
M:      Ralf Baechle <ralf@linux-mips.org>
M:      David Daney <david.daney@cavium.com>
L:      linux-edac@vger.kernel.org
L:      linux-mips@linux-mips.org
W:      bluesmoke.sourceforge.net
S:      Supported
F:      drivers/edac/octeon_edac*

EDAC-E752X
M:      Mark Gross <mark.gross@intel.com>
M:      Doug Thompson <dougthompson@xmission.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/e752x_edac.c

EDAC-E7XXX
M:      Doug Thompson <dougthompson@xmission.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/e7xxx_edac.c

EDAC-GHES
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/ghes-edac.c

EDAC-I82443BXGX
M:      Tim Small <tim@buttersideup.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/i82443bxgx_edac.c
```

```
EDAC-I3000
M:      Jason Uhlenkott <juhlenko@akamai.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/i3000_edac.c

EDAC-I5000
M:      Doug Thompson <dougthompson@xmission.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/i5000_edac.c

EDAC-I5400
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/i5400_edac.c

EDAC-I7300
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/i7300_edac.c

EDAC-I7CORE
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/i7core_edac.c

EDAC-I82975X
M:      Ranganathan Desikan <ravi@jetztechnologies.com>
M:      "Arvind R." <arvino55@gmail.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/i82975x_edac.c

EDAC-PASEMI
M:      Egor Martovetsky <egor@pasemi.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/pasemi_edac.c

EDAC-R82600
M:      Tim Small <tim@buttersideup.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/r82600_edac.c
```

```
EDAC-SBRIDGE
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-edac@vger.kernel.org
W:      bluesmoke.sourceforge.net
S:      Maintained
F:      drivers/edac/sb_edac.c

EDIROL UA-101/UA-1000 DRIVER
M:      Clemens Ladisch <clemens@ladisch.de>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
T:      git git://git.alsa-project.org/alsa-kernel.git
S:      Maintained
F:      sound/usb/misc/ua101.c

EXTENSIBLE FIRMWARE INTERFACE (EFI)
M:      Matt Fleming <matt.fleming@intel.com>
L:      linux-efi@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/mfleming/efi.git
S:      Maintained
F:      Documentation/x86/efi-stub.txt
F:      arch/ia64/kernel/efi.c
F:      arch/x86/boot/compressed/eboot.[ch]
F:      arch/x86/include/asm/efi.h
F:      arch/x86/platform/efi/*
F:      drivers/firmware/efi/*
F:      include/linux/efi*.h

EFI VARIABLE FILESYSTEM
M:      Matthew Garrett <matthew.garrett@nebula.com>
M:      Jeremy Kerr <jk@ozlabs.org>
M:      Matt Fleming <matt.fleming@intel.com>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/mfleming/efi.git
L:      linux-efi@vger.kernel.org
S:      Maintained
F:      fs/efivarfs/

EFIFB FRAMEBUFFER DRIVER
L:      linux-fbdev@vger.kernel.org
M:      Peter Jones <pjones@redhat.com>
S:      Maintained
F:      drivers/video/efifb.c

EFS FILESYSTEM
W:      http://aeschi.ch.eu.org/efs/
S:      Orphan
F:      fs/efs/

EHCA (IBM GX bus InfiniBand adapter) DRIVER
M:      Hoang-Nam Nguyen <hnguyen@de.ibm.com>
M:      Christoph Raisch <raisch@de.ibm.com>
L:      linux-rdma@vger.kernel.org
S:      Supported
F:      drivers/infiniband/hw/ehca/

EHEA (IBM pSeries eHEA 10Gb ethernet adapter) DRIVER
M:      Thadeu Lima de Souza Cascardo <cascardo@linux.vnet.ibm.com>
```

```
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/ibm/ehea/

EM28XX VIDEO4LINUX DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/em28xx/

EMBEDDED LINUX
M:      Paul Gortmaker <paul.gortmaker@windriver.com>
M:      Matt Mackall <mpm@selenic.com>
M:      David Woodhouse <dwmw2@infradead.org>
L:      linux-embedded@vger.kernel.org
S:      Maintained

EMULEX LPFC FC SCSI DRIVER
M:      James Smart <james.smart@emulex.com>
L:      linux-scsi@vger.kernel.org
W:      http://sourceforge.net/projects/lpfcxxxx
S:      Supported
F:      drivers/scsi/lpfc/

ENE CB710 FLASH CARD READER DRIVER
M:      Michał Mirosław <mirq-linux@rere.qmqm.pl>
S:      Maintained
F:      drivers/misc/cb710/
F:      drivers/mmc/host/cb710-mmc.*
F:      include/linux/cb710.h

ENE KB2426 (ENE0100/ENE020XX) INFRARED RECEIVER
M:      Maxim Levitsky <maximlevitsky@gmail.com>
S:      Maintained
F:      drivers/media/rc/ene_ir.*

EPSON S1D13XXX FRAMEBUFFER DRIVER
M:      Kristoffer Ericson <kristoffer.ericson@gmail.com>
S:      Maintained
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/kristoffer/linux-
hpc.git
F:      drivers/video/s1d13xxxfb.c
F:      include/video/s1d13xxxfb.h

ETHERNET BRIDGE
M:      Stephen Hemminger <stephen@networkplumber.org>
L:      bridge@lists.linux-foundation.org
L:      netdev@vger.kernel.org
W:      http://www.linuxfoundation.org/en/Net:Bridge
S:      Maintained
F:      include/linux/netfilter_bridge/
F:      net/bridge/

EXT2 FILE SYSTEM
M:      Jan Kara <jack@suse.cz>
```

```
L:      linux-ext4@vger.kernel.org
S:      Maintained
F:      Documentation/filesystems/ext2.txt
F:      fs/ext2/
F:      include/linux/ext2*

EXT3 FILE SYSTEM
M:      Jan Kara <jack@suse.cz>
M:      Andrew Morton <akpm@linux-foundation.org>
M:      Andreas Dilger <adilger.kernel@dilger.ca>
L:      linux-ext4@vger.kernel.org
S:      Maintained
F:      Documentation/filesystems/ext3.txt
F:      fs/ext3/

EXT4 FILE SYSTEM
M:      "Theodore Ts'o" <tytso@mit.edu>
M:      Andreas Dilger <adilger.kernel@dilger.ca>
L:      linux-ext4@vger.kernel.org
W:      http://ext4.wiki.kernel.org
Q:      http://patchwork.ozlabs.org/project/linux-ext4/list/
S:      Maintained
F:      Documentation/filesystems/ext4.txt
F:      fs/ext4/

Extended Verification Module (EVM)
M:      Mimi Zohar <zohar@us.ibm.com>
S:      Supported
F:      security/integrity/evm/

EXTERNAL CONNECTOR SUBSYSTEM (EXTCON)
M:      MyungJoo Ham <myungjoo.ham@samsung.com>
M:      Chanwoo Choi <cw00.choi@samsung.com>
L:      linux-kernel@vger.kernel.org
S:      Maintained
F:      drivers/extcon/
F:      Documentation/extcon/

EXYNOS DP DRIVER
M:      Jingoo Han <jg1.han@samsung.com>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/exynos/exynos_dp*
F:      include/video/exynos_dp*

EXYNOS MIPI DISPLAY DRIVERS
M:      Inki Dae <inki.dae@samsung.com>
M:      Donghwa Lee <dh09.lee@samsung.com>
M:      Kyungmin Park <kyungmin.park@samsung.com>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/exynos/exynos_mipi*
F:      include/video/exynos_mipi*

F71805F HARDWARE MONITORING DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
```

```
S:      Maintained
F:      Documentation/hwmon/f71805f
F:      drivers/hwmon/f71805f.c

FC0011 TUNER DRIVER
M:      Michael Buesch <m@bues.ch>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/tuners/fc0011.h
F:      drivers/media/tuners/fc0011.c

FC2580 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/tuners/fc2580*

FANOTIFY
M:      Eric Paris <eparis@redhat.com>
S:      Maintained
F:      fs/notify/fanotify/
F:      include/linux/fanotify.h
F:      include/uapi/linux/fanotify.h

FARSYNC SYNCHRONOUS DRIVER
M:      Kevin Curtis <kevin.curtis@farsite.co.uk>
W:      http://www.farsite.co.uk/
S:      Supported
F:      drivers/net/wan/farsync.*

FAULT INJECTION SUPPORT
M:      Akinobu Mita <akinobu.mita@gmail.com>
S:      Supported
F:      Documentation/fault-injection/
F:      lib/fault-inject.c

FCOE SUBSYSTEM (libfc, libfcoe, fcoe)
M:      Robert Love <robert.w.love@intel.com>
L:      fcoe-devel@open-fcoe.org
W:      www.Open-FCoE.org
S:      Supported
F:      drivers/scsi/libfc/
F:      drivers/scsi/fcoe/
F:      include/scsi/fc/
F:      include/scsi/libfc.h
F:      include/scsi/libfcoe.h
F:      include/uapi/scsi/fc/

FILE LOCKING (flock() and fcntl()/lockf())
M:      Matthew Wilcox <matthew@wil.cx>
L:      linux-fsdevel@vger.kernel.org
S:      Maintained
F:      include/linux/fcntl.h
```

```
F:      include/linux/fs.h
F:      include/uapi/linux/fcntl.h
F:      include/uapi/linux/fs.h
F:      fs/fcntl.c
F:      fs/locks.c

FILESYSTEMS (VFS and infrastructure)
M:      Alexander Viro <viro@zeniv.linux.org.uk>
L:      linux-fsdevel@vger.kernel.org
S:      Maintained
F:      fs/*

FINTEK F75375S HARDWARE MONITOR AND FAN CONTROLLER DRIVER
M:      Riku Voipio <riku.voipio@iki.fi>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/f75375s.c
F:      include/linux/f75375s.h

FIREWIRE AUDIO DRIVERS
M:      Clemens Ladisch <clemens@ladisch.de>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
T:      git git://git.alsa-project.org/alsa-kernel.git
S:      Maintained
F:      sound/firewire/

FIREWIRE MEDIA DRIVERS (firedtv)
M:      Stefan Richter <stefanr@s5r6.in-berlin.de>
L:      linux-media@vger.kernel.org
L:      linux1394-devel@lists.sourceforge.net
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/mchehab/linux-
media.git
S:      Maintained
F:      drivers/media/firewire/

FIREWIRE SBP-2 TARGET
M:      Chris Boot <bootc@bootc.net>
L:      linux-scsi@vger.kernel.org
L:      target-devel@vger.kernel.org
L:      linux1394-devel@lists.sourceforge.net
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/nab/lio-core-2.6.git
master
S:      Maintained
F:      drivers/target/sbp/

FIREWIRE SUBSYSTEM
M:      Stefan Richter <stefanr@s5r6.in-berlin.de>
L:      linux1394-devel@lists.sourceforge.net
W:      http://ieee1394.wiki.kernel.org/
T:      git
git://git.kernel.org/pub/scm/linux/kernel/git/ieee1394/linux1394.git
S:      Maintained
F:      drivers/firewire/
F:      include/linux/firewire.h
F:      include/uapi/linux/firewire*.h
F:      tools/firewire/
```

```
FIRMWARE LOADER (request_firmware)
M:      Ming Lei <ming.lei@canonical.com>
L:      linux-kernel@vger.kernel.org
S:      Maintained
F:      Documentation/firmware_class/
F:      drivers/base/firmware*.c
F:      include/linux/firmware.h

FLASHSYSTEM DRIVER (IBM FlashSystem 70/80 PCI SSD Flash Card)
M:      Joshua Morris <josh.h.morris@us.ibm.com>
M:      Philip Kelleher <pjk1939@linux.vnet.ibm.com>
S:      Maintained
F:      drivers/block/rsxx/

FLOPPY DRIVER
M:      Jiri Kosina <jkosina@suse.cz>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jikos/floppy.git
S:      Odd fixes
F:      drivers/block/floppy.c

FPU EMULATOR
M:      Bill Metzenthen <billm@melbpc.org.au>
W:      http://floatingpoint.sourceforge.net/emulator/index.html
S:      Maintained
F:      arch/x86/math-emu/

FRAME RELAY DLCI/FRAD (Sangoma drivers too)
L:      netdev@vger.kernel.org
S:      Orphan
F:      drivers/net/wan/dlci.c
F:      drivers/net/wan/sdla.c

FRAMEBUFFER LAYER
M:      Jean-Christophe Plagniol-Villard <plagnioj@jcrosoft.com>
M:      Tomi Valkeinen <tomi.valkeinen@ti.com>
L:      linux-fbdev@vger.kernel.org
W:      http://linux-fbdev.sourceforge.net/
Q:      http://patchwork.kernel.org/project/linux-fbdev/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/plagnioj/linux-
fbdev.git
S:      Maintained
F:      Documentation/fb/
F:      Documentation/devicetree/bindings/fb/
F:      drivers/video/
F:      include/video/
F:      include/linux/fb.h
F:      include/uapi/video/
F:      include/uapi/linux/fb.h

FREESCALE DIU FRAMEBUFFER DRIVER
M:      Timur Tabi <timur@tabi.org>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/fsl-diu-fb.*

FREESCALE DMA DRIVER
M:      Li Yang <leoli@freescale.com>
```

```
M:      Zhang Wei <zw@zh-kernel.org>
L:      linuxppc-dev@lists.ozlabs.org
S:      Maintained
F:      drivers/dma/fsldma.*

FREESCALE I2C CPM DRIVER
M:      Jochen Friedrich <jochen@scram.de>
L:      linuxppc-dev@lists.ozlabs.org
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      drivers/i2c/busses/i2c-cpm.c

FREESCALE IMX / MXC FRAMEBUFFER DRIVER
M:      Sascha Hauer <kernel@pengutronix.de>
L:      linux-fbdev@vger.kernel.org
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      include/linux/platform_data/video-imxfb.h
F:      drivers/video/imxfb.c

FREESCALE SOC FS_ENET DRIVER
M:      Pantelis Antoniou <pantelis.antoniou@gmail.com>
M:      Vitaly Bordug <vbordug@ru.mvista.com>
L:      linuxppc-dev@lists.ozlabs.org
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/freescale/fs_enet/
F:      include/linux/fs_enet_pd.h

FREESCALE QUICC ENGINE LIBRARY
L:      linuxppc-dev@lists.ozlabs.org
S:      Orphan
F:      arch/powerpc/sysdev/qe_lib/
F:      arch/powerpc/include/asm/*qe.h

FREESCALE USB PERIPHERAL DRIVERS
M:      Li Yang <leoli@freescale.com>
L:      linux-usb@vger.kernel.org
L:      linuxppc-dev@lists.ozlabs.org
S:      Maintained
F:      drivers/usb/gadget/fsl*

FREESCALE QUICC ENGINE UCC ETHERNET DRIVER
M:      Li Yang <leoli@freescale.com>
L:      netdev@vger.kernel.org
L:      linuxppc-dev@lists.ozlabs.org
S:      Maintained
F:      drivers/net/ethernet/freescale/ucc_geth*

FREESCALE QUICC ENGINE UCC UART DRIVER
M:      Timur Tabi <timur@tabi.org>
L:      linuxppc-dev@lists.ozlabs.org
S:      Maintained
F:      drivers/tty/serial/ucc_uart.c

FREESCALE SOC SOUND DRIVERS
M:      Timur Tabi <timur@tabi.org>
```

```
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
L:      linuxppc-dev@lists.ozlabs.org
S:      Maintained
F:      sound/soc/fsl/fsl*
F:      sound/soc/fsl/mpc8610_hpcd.c

FREEVXFS FILESYSTEM
M:      Christoph Hellwig <hch@infradead.org>
W:      ftp://ftp.openlinux.org/pub/people/hch/vxfs
S:      Maintained
F:      fs/freevxfs/

FREEZER
M:      Pavel Machek <pavel@ucw.cz>
M:      "Rafael J. Wysocki" <rjw@sisk.pl>
L:      linux-pm@vger.kernel.org
S:      Supported
F:      Documentation/power/freezing-of-tasks.txt
F:      include/linux/freezer.h
F:      kernel/freezer.c

FRONTSWAP API
M:      Konrad Rzeszutek Wilk <konrad.wilk@oracle.com>
L:      linux-kernel@vger.kernel.org
S:      Maintained
F:      mm/frontswap.c
F:      include/linux/frontswap.h

FS-CACHE: LOCAL CACHING FOR NETWORK FILESYSTEMS
M:      David Howells <dhowells@redhat.com>
L:      linux-cachefs@redhat.com
S:      Supported
F:      Documentation/filesystems/caching/
F:      fs/fscache/
F:      include/linux/fscache*.h

F2FS FILE SYSTEM
M:      Jaegeuk Kim <jaegeuk.kim@samsung.com>
L:      linux-f2fs-devel@lists.sourceforge.net
W:      http://en.wikipedia.org/wiki/F2FS
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jaegeuk/f2fs.git
S:      Maintained
F:      Documentation/filesystems/f2fs.txt
F:      fs/f2fs/
F:      include/linux/f2fs_fs.h

FUJITSU FR-V (FRV) PORT
M:      David Howells <dhowells@redhat.com>
S:      Maintained
F:      arch/frv/

FUJITSU LAPTOP EXTRAS
M:      Jonathan Woithe <jwoithe@just42.net>
L:      platform-driver-x86@vger.kernel.org
S:      Maintained
F:      drivers/platform/x86/fujitsu-laptop.c
```

```
FUJITSU M-5MO LS CAMERA ISP DRIVER
M:      Kyungmin Park <kyungmin.park@samsung.com>
M:      Heungjun Kim <riverful.kim@samsung.com>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/i2c/m5mols/
F:      include/media/m5mols.h

FUJITSU TABLET EXTRAS
M:      Robert Gerlach <khnz@gmx.de>
L:      platform-driver-x86@vger.kernel.org
S:      Maintained
F:      drivers/platform/x86/fujitsu-tablet.c

FUSE: FILESYSTEM IN USERSPACE
M:      Miklos Szeredi <miklos@szeredi.hu>
L:      fuse-devel@lists.sourceforge.net
W:      http://fuse.sourceforge.net/
S:      Maintained
F:      fs/fuse/
F:      include/uapi/linux/fuse.h

FUTURE DOMAIN TMC-16x0 SCSI DRIVER (16-bit)
M:      Rik Faith <faith@cs.unc.edu>
L:      linux-scsi@vger.kernel.org
S:      Odd Fixes (e.g., new signatures)
F:      drivers/scsi/fdomain.*

GDT SCSI DISK ARRAY CONTROLLER DRIVER
M:      Achim Leubner <achim_leubner@adaptec.com>
L:      linux-scsi@vger.kernel.org
W:      http://www.icp-vortex.com/
S:      Supported
F:      drivers/scsi/gdt*

GEMTEK FM RADIO RECEIVER DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/radio/radio-gemtek*

GENERIC GPIO I2C DRIVER
M:      Haavard Skinnemoen <hskinnemoen@gmail.com>
S:      Supported
F:      drivers/i2c/busses/i2c-gpio.c
F:      include/linux/i2c-gpio.h

GENERIC GPIO I2C MULTIPLEXER DRIVER
M:      Peter Korsgaard <peter.korsgaard@barco.com>
L:      linux-i2c@vger.kernel.org
S:      Supported
F:      drivers/i2c/muxes/i2c-mux-gpio.c
F:      include/linux/i2c-mux-gpio.h
F:      Documentation/i2c/muxes/i2c-mux-gpio
```

```
GENERIC HDLC (WAN) DRIVERS
M:      Krzysztof Halasa <khc@pm.waw.pl>
W:      http://www.kernel.org/pub/linux/utils/net/hdlc/
S:      Maintained
F:      drivers/net/wan/c101.c
F:      drivers/net/wan/hd6457*
F:      drivers/net/wan/hdlc*
F:      drivers/net/wan/n2.c
F:      drivers/net/wan/pc300too.c
F:      drivers/net/wan/pci200syn.c
F:      drivers/net/wan/wanxl*

GENERIC INCLUDE/ASM HEADER FILES
M:      Arnd Bergmann <arnd@arndb.de>
L:      linux-arch@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/arnd/asm-generic.git
S:      Maintained
F:      include/asm-generic
F:      include/uapi/asm-generic

GENERIC UIO DRIVER FOR PCI DEVICES
M:      "Michael S. Tsirkin" <mst@redhat.com>
L:      kvm@vger.kernel.org
S:      Supported
F:      drivers/uio/uio_pci_generic.c

GFS2 FILE SYSTEM
M:      Steven Whitehouse <swhiteho@redhat.com>
L:      cluster-devel@redhat.com
W:      http://sources.redhat.com/cluster/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/steve/gfs2-3.0-
fixes.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/steve/gfs2-3.0-
nmw.git
S:      Supported
F:      Documentation/filesystems/gfs2*.txt
F:      fs/gfs2/
F:      include/uapi/linux/gfs2_ondisk.h

GIGASET ISDN DRIVERS
M:      Hansjoerg Lipp <hjlipp@web.de>
M:      Tilman Schmidt <tilman@imap.cc>
L:      gigaset307x-common@lists.sourceforge.net
W:      http://gigaset307x.sourceforge.net/
S:      Maintained
F:      Documentation/isdn/README.gigaset
F:      drivers/isdn/gigaset/
F:      include/uapi/linux/gigaset_dev.h

GPIO SUBSYSTEM
M:      Grant Likely <grant.likely@linaro.org>
M:      Linus Walleij <linus.walleij@linaro.org>
S:      Maintained
T:      git git://git.secretlab.ca/git/linux-2.6.git
F:      Documentation/gpio.txt
F:      drivers/gpio/
F:      include/linux/gpio*
```

```
F:      include/asm-generic/gpio.h

GRE DEMULTIPLEXER DRIVER
M:      Dmitry Kozlov <xeb@mail.ru>
L:      netdev@vger.kernel.org
S:      Maintained
F:      net/ipv4/gre.c
F:      include/net/gre.h

GRETH 10/100/1G Ethernet MAC device driver
M:      Kristoffer Glembo <kristoffer@gaisler.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/aeroflex/

GSPCA FINEPIX SUBDRIVER
M:      Frank Zago <frank@zago.net>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/gspca/finepix.c

GSPCA GL860 SUBDRIVER
M:      Olivier Lorin <o.lorin@laposte.net>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/gspca/gl860/

GSPCA M5602 SUBDRIVER
M:      Erik Andren <erik.andren@gmail.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/gspca/m5602/

GSPCA PAC207 SONIXB SUBDRIVER
M:      Hans de Goede <hdegoede@redhat.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/gspca/pac207.c

GSPCA SN9C20X SUBDRIVER
M:      Brian Johnson <brijohn@gmail.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/gspca/sn9c20x.c

GSPCA T613 SUBDRIVER
M:      Leandro Costantino <lcostantino@gmail.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/gspca/t613.c
```

```
GSPCA USB WEBCAM DRIVER
M:      Hans de Goede <hdegoede@redhat.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/gspca/

STK1160 USB VIDEO CAPTURE DRIVER
M:      Ezequiel Garcia <elezegarcia@gmail.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/stk1160/

HARD DRIVE ACTIVE PROTECTION SYSTEM (HDAPS) DRIVER
M:      Frank Seidel <frank@f-seidel.de>
L:      platform-driver-x86@vger.kernel.org
W:      http://www.kernel.org/pub/linux/kernel/people/fseidel/hdaps/
S:      Maintained
F:      drivers/platform/x86/hdaps.c

HDPVR USB VIDEO ENCODER DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Odd Fixes
F:      drivers/media/usb/hdpvr

HWPOISON MEMORY FAILURE HANDLING
M:      Andi Kleen <andi@firstfloor.org>
L:      linux-mm@kvack.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/ak/linux-mce-2.6.git
hwpoison
S:      Maintained
F:      mm/memory-failure.c
F:      mm/hwpoison-inject.c

HYPERVISOR VIRTUAL CONSOLE DRIVER
L:      linuxppc-dev@lists.ozlabs.org
S:      Odd Fixes
F:      drivers/tty/hvc/

HARDWARE MONITORING
M:      Jean Delvare <khali@linux-fr.org>
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
W:      http://www.lm-sensors.org/
T:      quilt kernel.org/pub/linux/kernel/people/jdelvare/linux-2.6/jdelvare-
hwmon/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/groeck/linux-
staging.git
S:      Maintained
F:      Documentation/hwmon/
F:      drivers/hwmon/
F:      include/linux/hwmon*.h
```

```
HARDWARE RANDOM NUMBER GENERATOR CORE
M:      Matt Mackall <mpm@selenic.com>
M:      Herbert Xu <herbert@gondor.apana.org.au>
S:      Odd fixes
F:      Documentation/hw_random.txt
F:      drivers/char/hw_random/
F:      include/linux/hw_random.h

HARDWARE SPINLOCK CORE
M:      Ohad Ben-Cohen <ohad@wizery.com>
S:      Maintained
F:      Documentation/hwspinlock.txt
F:      drivers/hwspinlock/hwspinlock_*
F:      include/linux/hwspinlock.h

HARMONY SOUND DRIVER
L:      linux-parisc@vger.kernel.org
S:      Maintained
F:      sound/parisc/harmony.*

HD29L2 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/dvb-frontends/hd29l2*

HEWLETT-PACKARD SMART2 RAID DRIVER
M:      Chirag Kantharia <chirag.kantharia@hp.com>
L:      iss_storagedev@hp.com
S:      Maintained
F:      Documentation/blockdev/cpqarray.txt
F:      drivers/block/cpqarray.*

HEWLETT-PACKARD SMART ARRAY RAID DRIVER (hpsa)
M:      "Stephen M. Cameron" <scameron@beardog.cce.hp.com>
L:      iss_storagedev@hp.com
S:      Supported
F:      Documentation/scsi/hpsa.txt
F:      drivers/scsi/hpsa*.[ch]
F:      include/linux/cciss*.h
F:      include/uapi/linux/cciss*.h

HEWLETT-PACKARD SMART CISS RAID DRIVER (cciss)
M:      Mike Miller <mike.miller@hp.com>
L:      iss_storagedev@hp.com
S:      Supported
F:      Documentation/blockdev/cciss.txt
F:      drivers/block/cciss*
F:      include/linux/cciss_ioctl.h
F:      include/uapi/linux/cciss_ioctl.h

HFS FILESYSTEM
L:      linux-fsdevel@vger.kernel.org
```

```
S:      Orphan
F:      Documentation/filesystems/hfs.txt
F:      fs/hfs/

HGA FRAMEBUFFER DRIVER
M:      Ferenc Bakonyi <fero@drama.obuda.kando.hu>
L:      linux-nvidia@lists.surfsouth.com
W:      http://drama.obuda.kando.hu/~fero/cgi-bin/hgafb.shtml
S:      Maintained
F:      drivers/video/hgafb.c

HIBERNATION (aka Software Suspend, aka swsusp)
M:      Pavel Machek <pavel@ucw.cz>
M:      "Rafael J. Wysocki" <rjw@sisk.pl>
L:      linux-pm@vger.kernel.org
S:      Supported
F:      arch/x86/power/
F:      drivers/base/power/
F:      kernel/power/
F:      include/linux/suspend.h
F:      include/linux/freezer.h
F:      include/linux/pm.h
F:      arch/*/include/asm/suspend*.h

HID CORE LAYER
M:      Jiri Kosina <jkosina@suse.cz>
L:      linux-input@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jikos/hid.git
S:      Maintained
F:      drivers/hid/
F:      include/linux/hid*
F:      include/uapi/linux/hid*

HIGH-RESOLUTION TIMERS, CLOCKEVENTS, DYNTICKS
M:      Thomas Gleixner <tglx@linutronix.de>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tip/tip.git
timers/core
S:      Maintained
F:      Documentation/timers/
F:      kernel/hrtimer.c
F:      kernel/time/clockevents.c
F:      kernel/time/tick*.*
F:      kernel/time/timer_*.c
F:      include/linux/clockchips.h
F:      include/linux/hrtimer.h

HIGH-SPEED SCC DRIVER FOR AX.25
L:      linux-hams@vger.kernel.org
S:      Orphan
F:      drivers/net/hamradio/dmascc.c
F:      drivers/net/hamradio/scc.c

HIGHPOINT ROCKETRAID 3xxx RAID DRIVER
M:      HighPoint Linux Team <linux@highpoint-tech.com>
W:      http://www.highpoint-tech.com
S:      Supported
F:      Documentation/scsi/hptiop.txt
```

```
F:      drivers/scsi/hptiop.c

HIPPI
M:      Jes Sorensen <jes@trained-monkey.org>
L:      linux-hippi@sunsite.dk
S:      Maintained
F:      include/linux/hippidevice.h
F:      include/uapi/linux/if_hippi.h
F:      net/802/hippi.c
F:      drivers/net/hippi/

HOST AP DRIVER
M:      Jouni Malinen <j@w1.fi>
L:      hostap@shmoo.com (subscribers-only)
L:      linux-wireless@vger.kernel.org
W:      http://hostap.epitest.fi/
S:      Maintained
F:      drivers/net/wireless/hostap/

HP COMPAQ TC1100 TABLET WMI EXTRAS DRIVER
L:      platform-driver-x86@vger.kernel.org
S:      Orphan
F:      drivers/platform/x86/tc1100-wmi.c

HP100:  Driver for HP 10/100 Mbit/s Voice Grade Network Adapter Series
M:      Jaroslav Kysela <perex@perex.cz>
S:      Maintained
F:      drivers/net/ethernet/hp/hp100.*

HPET:   High Precision Event Timers driver
M:      Clemens Ladisch <clemens@ladisch.de>
S:      Maintained
F:      Documentation/timers/hpet.txt
F:      drivers/char/hpet.c
F:      include/linux/hpet.h
F:      include/uapi/linux/hpet.h

HPET:   x86
M:      "Venkatesh Pallipadi (Venki)" <venki@google.com>
S:      Maintained
F:      arch/x86/kernel/hpet.c
F:      arch/x86/include/asm/hpet.h

HPFS FILESYSTEM
M:      Mikulas Patocka <mikulas@artax.karlin.mff.cuni.cz>
W:      http://artax.karlin.mff.cuni.cz/~mikulas/vyplody/hpfs/index-e.cgi
S:      Maintained
F:      fs/hpfs/

HSO 3G MODEM DRIVER
M:      Jan Dumon <j.dumon@option.com>
W:      http://www.pharscape.org
S:      Maintained
F:      drivers/net/usb/hso.c

HTCPEN TOUCHSCREEN DRIVER
M:      Pau Oliva Fora <pof@eslack.org>
```

```
L:      linux-input@vger.kernel.org
S:      Maintained
F:      drivers/input/touchscreen/htcpen.c

HUGETLB FILESYSTEM
M:      Nadia Yvette Chambers <nyc@holomorphy.com>
S:      Maintained
F:      fs/hugetlbfs/

Hyper-V CORE AND DRIVERS
M:      K. Y. Srinivasan <kys@microsoft.com>
M:      Haiyang Zhang <haiyangz@microsoft.com>
L:      devel@linuxdriverproject.org
S:      Maintained
F:      arch/x86/include/asm/mshyperv.h
F:      arch/x86/include/uapi/asm/hyperv.h
F:      arch/x86/kernel/cpu/mshyperv.c
F:      drivers/hid/hid-hyperv.c
F:      drivers/hv/
F:      drivers/net/hyperv/
F:      drivers/scsi/storvsc_drv.c
F:      drivers/video/hyperv_fb.c
F:      include/linux/hyperv.h
F:      tools/hv/

I2C OVER PARALLEL PORT
M:      Jean Delvare <khali@linux-fr.org>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      Documentation/i2c/busses/i2c-parport
F:      Documentation/i2c/busses/i2c-parport-light
F:      drivers/i2c/busses/i2c-parport.c
F:      drivers/i2c/busses/i2c-parport-light.c

I2C/SMBUS CONTROLLER DRIVERS FOR PC
M:      Jean Delvare <khali@linux-fr.org>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      Documentation/i2c/busses/i2c-ali1535
F:      Documentation/i2c/busses/i2c-ali1563
F:      Documentation/i2c/busses/i2c-ali15x3
F:      Documentation/i2c/busses/i2c-amd756
F:      Documentation/i2c/busses/i2c-amd8111
F:      Documentation/i2c/busses/i2c-i801
F:      Documentation/i2c/busses/i2c-nforce2
F:      Documentation/i2c/busses/i2c-piix4
F:      Documentation/i2c/busses/i2c-sis5595
F:      Documentation/i2c/busses/i2c-sis630
F:      Documentation/i2c/busses/i2c-sis96x
F:      Documentation/i2c/busses/i2c-via
F:      Documentation/i2c/busses/i2c-viapro
F:      drivers/i2c/busses/i2c-ali1535.c
F:      drivers/i2c/busses/i2c-ali1563.c
F:      drivers/i2c/busses/i2c-ali15x3.c
F:      drivers/i2c/busses/i2c-amd756.c
F:      drivers/i2c/busses/i2c-amd756-s4882.c
F:      drivers/i2c/busses/i2c-amd8111.c
```

```
F:      drivers/i2c/busses/i2c-i801.c
F:      drivers/i2c/busses/i2c-isch.c
F:      drivers/i2c/busses/i2c-nforce2.c
F:      drivers/i2c/busses/i2c-nforce2-s4985.c
F:      drivers/i2c/busses/i2c-piix4.c
F:      drivers/i2c/busses/i2c-sis5595.c
F:      drivers/i2c/busses/i2c-sis630.c
F:      drivers/i2c/busses/i2c-sis96x.c
F:      drivers/i2c/busses/i2c-via.c
F:      drivers/i2c/busses/i2c-viapro.c

I2C/SMBUS ISMT DRIVER
M:      Seth Heasley <seth.heasley@intel.com>
M:      Neil Horman <nhorman@tuxdriver.com>
L:      linux-i2c@vger.kernel.org
F:      drivers/i2c/busses/i2c-ismt.c
F:      Documentation/i2c/busses/i2c-ismt

I2C/SMBUS STUB DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      drivers/i2c/i2c-stub.c

I2C SUBSYSTEM
M:      Wolfram Sang <wsa@the-dreams.de>
L:      linux-i2c@vger.kernel.org
W:      http://i2c.wiki.kernel.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/wsa/linux.git
S:      Maintained
F:      Documentation/i2c/
F:      drivers/i2c/
F:      include/linux/i2c.h
F:      include/linux/i2c-*.h
F:      include/uapi/linux/i2c.h
F:      include/uapi/linux/i2c-*.h

I2C-TAOS-EVM DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      Documentation/i2c/busses/i2c-taos-evm
F:      drivers/i2c/busses/i2c-taos-evm.c

I2C-TINY-USB DRIVER
M:      Till Harbaum <till@harbaum.org>
L:      linux-i2c@vger.kernel.org
W:      http://www.harbaum.org/till/i2c_tiny_usb
S:      Maintained
F:      drivers/i2c/busses/i2c-tiny-usb.c

i386 BOOT CODE
M:      "H. Peter Anvin" <hpa@zytor.com>
S:      Maintained
F:      arch/x86/boot/

i386 SETUP CODE / CPU ERRATA WORKAROUNDS
```

```
M:      "H. Peter Anvin" <hpa@zytor.com>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/hpa/linux-2.6-
x86setup.git
S:      Maintained

IA64 (Itanium) PLATFORM
M:      Tony Luck <tony.luck@intel.com>
M:      Fenghua Yu <fenghua.yu@intel.com>
L:      linux-ia64@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/aegl/linux.git
S:      Maintained
F:      arch/ia64/

IBM Power in-Nest Crypto Acceleration
M:      Kent Yoder <key@linux.vnet.ibm.com>
L:      linux-crypto@vger.kernel.org
S:      Supported
F:      drivers/crypto/nx/

IBM Power 842 compression accelerator
M:      Robert Jennings <rcj@linux.vnet.ibm.com>
S:      Supported
F:      drivers/crypto/nx/nx-842.c
F:      include/linux/nx842.h

IBM Power Linux RAID adapter
M:      Brian King <brking@us.ibm.com>
S:      Supported
F:      drivers/scsi/ipr.*

IBM Power Virtual Ethernet Device Driver
M:      Santiago Leon <santil@linux.vnet.ibm.com>
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/ibm/ibmveth.*

IBM Power Virtual SCSI/FC Device Drivers
M:      Robert Jennings <rcj@linux.vnet.ibm.com>
L:      linux-scsi@vger.kernel.org
S:      Supported
F:      drivers/scsi/ibmvscsi/
X:      drivers/scsi/ibmvscsi/ibmvstgt.c

IBM ServeRAID RAID DRIVER
P:      Jack Hammer
M:      Dave Jeffery <ipslinux@adaptec.com>
W:      http://www.developer.ibm.com/welcome/netfinity/serveraid.html
S:      Supported
F:      drivers/scsi/ips.*

ICH LPC AND GPIO DRIVER
M:      Peter Tyser <ptyser@xes-inc.com>
S:      Maintained
F:      drivers/mfd/lpc_ich.c
F:      drivers/gpio/gpio-ich.c

IDE SUBSYSTEM
```

```
M:      "David S. Miller" <davem@davemloft.net>
L:      linux-ide@vger.kernel.org
Q:      http://patchwork.ozlabs.org/project/linux-ide/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/ide.git
S:      Maintained
F:      Documentation/ide/
F:      drivers/ide/
F:      include/linux/ide.h

IDEAPAD LAPTOP EXTRAS DRIVER
M:      Ike Panhc <ike.pan@canonical.com>
L:      platform-driver-x86@vger.kernel.org
W:      http://launchpad.net/ideapad-laptop
S:      Maintained
F:      drivers/platform/x86/ideapad-laptop.c

IDE/ATAPI DRIVERS
M:      Borislav Petkov <bp@alien8.de>
L:      linux-ide@vger.kernel.org
S:      Maintained
F:      Documentation/cdrom/ide-cd
F:      drivers/ide/ide-cd*

IDLE-I7300
M:      Andy Henroid <andrew.d.henroid@intel.com>
L:      linux-pm@vger.kernel.org
S:      Supported
F:      drivers/idle/i7300_idle.c

IEEE 802.15.4 SUBSYSTEM
M:      Alexander Smirnov <alex.bluesman.smirnov@gmail.com>
M:      Dmitry Eremin-Solenikov <dbaryshkov@gmail.com>
L:      linux-zigbee-devel@lists.sourceforge.net (moderated for non-
subscribers)
W:      http://apps.sourceforge.net/trac/linux-zigbee
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/lowpan/lowpan.git
S:      Maintained
F:      net/ieee802154/
F:      net/mac802154/
F:      drivers/net/ieee802154/

IGUANAWORKS USB IR TRANSCEIVER
M:      Sean Young <sean@mess.org>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/rc/iguanair.c

IIO SUBSYSTEM AND DRIVERS
M:      Jonathan Cameron <jic23@cam.ac.uk>
L:      linux-iio@vger.kernel.org
S:      Maintained
F:      drivers/iio/
F:      drivers/staging/iio/

IKANOS/ADI EAGLE ADSL USB DRIVER
M:      Matthieu Castet <castet.matthieu@free.fr>
M:      Stanislaw Gruszka <stf_xl@wp.pl>
```

```
S:      Maintained
F:      drivers/usb/atm/ueagle-atm.c

INA209 HARDWARE MONITOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/ina209
F:      Documentation/devicetree/bindings/i2c/ina209.txt
F:      drivers/hwmon/ina209.c

INA2XX HARDWARE MONITOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/ina2xx
F:      drivers/hwmon/ina2xx.c
F:      include/linux/platform_data/ina2xx.h

INDUSTRY PACK SUBSYSTEM (IPACK)
M:      Samuel Iglesias Gonsalvez <siglesias@igalia.com>
M:      Jens Taprogge <jens.taprogge@taprogge.org>
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
L:      industrypack-devel@lists.sourceforge.net
W:      http://industrypack.sourceforge.net
S:      Maintained
F:      drivers/ipack/

INTEGRITY MEASUREMENT ARCHITECTURE (IMA)
M:      Mimi Zohar <zohar@us.ibm.com>
S:      Supported
F:      security/integrity/ima/

IMS TWINTURBO FRAMEBUFFER DRIVER
L:      linux-fbdev@vger.kernel.org
S:      Orphan
F:      drivers/video/imsttfb.c

INFINIBAND SUBSYSTEM
M:      Roland Dreier <roland@kernel.org>
M:      Sean Hefty <sean.hefty@intel.com>
M:      Hal Rosenstock <hal.rosenstock@gmail.com>
L:      linux-rdma@vger.kernel.org
W:      http://www.openfabrics.org/
Q:      http://patchwork.kernel.org/project/linux-rdma/list/
T:      git
git://git.kernel.org/pub/scm/linux/kernel/git/roland/infiniband.git
S:      Supported
F:      Documentation/infiniband/
F:      drivers/infiniband/
F:      include/uapi/linux/if_infiniband.h

INOTIFY
M:      John McCutchan <john@johnmccutchan.com>
M:      Robert Love <rlove@rlove.org>
M:      Eric Paris <eparis@parisplace.org>
S:      Maintained
```

```
F:      Documentation/filesystems/inotify.txt
F:      fs/notify/inotify/
F:      include/linux/inotify.h
F:      include/uapi/linux/inotify.h

INPUT (KEYBOARD, MOUSE, JOYSTICK, TOUCHSCREEN) DRIVERS
M:      Dmitry Torokhov <dmitry.torokhov@gmail.com>
M:      Dmitry Torokhov <dtor@mail.ru>
L:      linux-input@vger.kernel.org
Q:      http://patchwork.kernel.org/project/linux-input/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/dtor/input.git
S:      Maintained
F:      drivers/input/
F:      include/linux/input.h
F:      include/uapi/linux/input.h
F:      include/linux/input/

INPUT MULTITOUCH (MT) PROTOCOL
M:      Henrik Rydberg <rydberg@euromail.se>
L:      linux-input@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/rydberg/input-mt.git
S:      Maintained
F:      Documentation/input/multi-touch-protocol.txt
F:      drivers/input/input-mt.c
K:      \b(ABS|SYN)_MT_

INTEL C600 SERIES SAS CONTROLLER DRIVER
M:      Intel SCU Linux support <intel-linux-scu@intel.com>
M:      Lukasz Dorau <lukasz.dorau@intel.com>
M:      Maciej Patelczyk <maciej.patelczyk@intel.com>
M:      Dave Jiang <dave.jiang@intel.com>
L:      linux-scsi@vger.kernel.org
T:      git git://git.code.sf.net/p/intel-sas/isci
S:      Supported
F:      drivers/scsi/isci/

INTEL IDLE DRIVER
M:      Len Brown <lenb@kernel.org>
L:      linux-pm@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/lenb/linux.git
S:      Supported
F:      drivers/idle/intel_idle.c

INTEL FRAMEBUFFER DRIVER (excluding 810 and 815)
M:      Maik Broemme <mbroemme@plusserver.de>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      Documentation/fb/intelfb.txt
F:      drivers/video/intelfb/

INTEL 810/815 FRAMEBUFFER DRIVER
M:      Antonino Daplas <adaplas@gmail.com>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/i810/

INTEL MENLOW THERMAL DRIVER
```

```
M:      Sujith Thomas <sujith.thomas@intel.com>
L:      platform-driver-x86@vger.kernel.org
W:      http://www.lesswatts.org/projects/acpi/
S:      Supported
F:      drivers/platform/x86/intel_menlow.c

INTEL IA32 MICROCODE UPDATE SUPPORT
M:      Tigran Aivazian <tigran@aivazian.fsnet.co.uk>
S:      Maintained
F:      arch/x86/kernel/microcode_core.c
F:      arch/x86/kernel/microcode_intel.c

INTEL I/OAT DMA DRIVER
M:      Dan Williams <djbw@fb.com>
S:      Maintained
F:      drivers/dma/ioat*

INTEL IOMMU (VT-d)
M:      David Woodhouse <dwmw2@infradead.org>
L:      iommu@lists.linux-foundation.org
T:      git git://git.infradead.org/iommu-2.6.git
S:      Supported
F:      drivers/iommu/intel-iommu.c
F:      include/linux/intel-iommu.h

INTEL IOP-ADMA DMA DRIVER
M:      Dan Williams <djbw@fb.com>
S:      Odd fixes
F:      drivers/dma/iop-adma.c

INTEL IXP4XX QMGR, NPE, ETHERNET and HSS SUPPORT
M:      Krzysztof Halasa <khc@pm.waw.pl>
S:      Maintained
F:      arch/arm/mach-ixp4xx/include/mach/qmgr.h
F:      arch/arm/mach-ixp4xx/include/mach/npe.h
F:      arch/arm/mach-ixp4xx/ixp4xx_qmgr.c
F:      arch/arm/mach-ixp4xx/ixp4xx_npe.c
F:      drivers/net/ethernet/xscale/ixp4xx_eth.c
F:      drivers/net/wan/ixp4xx_hss.c

INTEL IXP4XX RANDOM NUMBER GENERATOR SUPPORT
M:      Deepak Saxena <dsaxena@plexity.net>
S:      Maintained
F:      drivers/char/hw_random/ixp4xx-rng.c

INTEL ETHERNET DRIVERS (e100/e1000/e1000e/igb/igbvf/ixgb/ixgbe/ixgbevf)
M:      Jeff Kirsher <jeffrey.t.kirsher@intel.com>
M:      Jesse Brandeburg <jesse.brandeburg@intel.com>
M:      Bruce Allan <bruce.w.allan@intel.com>
M:      Carolyn Wyborny <carolyn.wyborny@intel.com>
M:      Don Skidmore <donald.c.skidmore@intel.com>
M:      Greg Rose <gregory.v.rose@intel.com>
M:      Peter P Waskiewicz Jr <peter.p.waskiewicz.jr@intel.com>
M:      Alex Duyck <alexander.h.duyck@intel.com>
M:      John Ronciak <john.ronciak@intel.com>
M:      Tushar Dave <tushar.n.dave@intel.com>
L:      e1000-devel@lists.sourceforge.net
```

```
W:      http://www.intel.com/support/feedback.htm
W:      http://e1000.sourceforge.net/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jkirsher/net.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jkirsher/net-
next.git
S:      Supported
F:      Documentation/networking/e100.txt
F:      Documentation/networking/e1000.txt
F:      Documentation/networking/e1000e.txt
F:      Documentation/networking/igb.txt
F:      Documentation/networking/igbvf.txt
F:      Documentation/networking/ixgb.txt
F:      Documentation/networking/ixgbe.txt
F:      Documentation/networking/ixgbevf.txt
F:      drivers/net/ethernet/intel/

INTEL PRO/WIRELESS 2100, 2200BG, 2915ABG NETWORK CONNECTION SUPPORT
M:      Stanislav Yakovlev <stas.yakovlev@gmail.com>
L:      linux-wireless@vger.kernel.org
S:      Maintained
F:      Documentation/networking/README.ipw2100
F:      Documentation/networking/README.ipw2200
F:      drivers/net/wireless/ipw2x00/

INTEL(R) TRUSTED EXECUTION TECHNOLOGY (TXT)
M:      Richard L Maliszewski <richard.l.maliszewski@intel.com>
M:      Gang Wei <gang.wei@intel.com>
M:      Shane Wang <shane.wang@intel.com>
L:      tboot-devel@lists.sourceforge.net
W:      http://tboot.sourceforge.net
T:      hg http://tboot.hg.sourceforge.net:8000/hgroot/tboot/tboot
S:      Supported
F:      Documentation/intel_txt.txt
F:      include/linux/tboot.h
F:      arch/x86/kernel/tboot.c

INTEL WIRELESS WIMAX CONNECTION 2400
M:      Inaky Perez-Gonzalez <inaky.perez-gonzalez@intel.com>
M:      linux-wimax@intel.com
L:      wimax@linuxwimax.org
S:      Supported
W:      http://linuxwimax.org
F:      Documentation/wimax/README.i2400m
F:      drivers/net/wimax/i2400m/
F:      include/uapi/linux/wimax/i2400m.h

INTEL WIRELESS 3945ABG/BG, 4965AGN (iwlegacy)
M:      Stanislaw Gruszka <sgruszka@redhat.com>
L:      linux-wireless@vger.kernel.org
S:      Supported
F:      drivers/net/wireless/iwlegacy/

INTEL WIRELESS WIFI LINK (iwlwifi)
M:      Johannes Berg <johannes.berg@intel.com>
M:      Wey-Yi Guy <wey-yi.w.guy@intel.com>
M:      Intel Linux Wireless <ilw@linux.intel.com>
L:      linux-wireless@vger.kernel.org
```

```
W:      http://intellinuxwireless.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/iwlwifi/iwlwifi.git
S:      Supported
F:      drivers/net/wireless/iwlwifi/

INTEL MANAGEMENT ENGINE (mei)
M:      Tomas Winkler <tomas.winkler@intel.com>
L:      linux-kernel@vger.kernel.org
S:      Supported
F:      include/uapi/linux/mei.h
F:      drivers/misc/mei/*
F:      Documentation/misc-devices/mei/*

IOC3 ETHERNET DRIVER
M:      Ralf Baechle <ralf@linux-mips.org>
L:      linux-mips@linux-mips.org
S:      Maintained
F:      drivers/net/ethernet/sgi/ioc3-eth.c

IOC3 SERIAL DRIVER
M:      Pat Gefre <pfg@sgi.com>
L:      linux-serial@vger.kernel.org
S:      Maintained
F:      drivers/tty/serial/ioc3_serial.c

IP MASQUERADING
M:      Juanjo Ciarlante <jjciarla@raiz.uncu.edu.ar>
S:      Maintained
F:      net/ipv4/netfilter/ipt_MASQUERADE.c

IP1000A 10/100/1000 GIGABIT ETHERNET DRIVER
M:      Francois Romieu <romieu@fr.zoreil.com>
M:      Sorbica Shieh <sorbica@icplus.com.tw>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/icplus/ipg.*

IPATH DRIVER
M:      Mike Marciniszyn <infinipath@intel.com>
L:      linux-rdma@vger.kernel.org
S:      Maintained
F:      drivers/infiniband/hw/ipath/

IPMI SUBSYSTEM
M:      Corey Minyard <minyard@acm.org>
L:      openipmi-developer@lists.sourceforge.net (moderated for non-
subscribers)
W:      http://openipmi.sourceforge.net/
S:      Supported
F:      Documentation/IPMI.txt
F:      drivers/char/ipmi/
F:      include/linux/ipmi*
F:      include/uapi/linux/ipmi*

IPS SCSI RAID DRIVER
M:      Adaptec OEM Raid Solutions <aacraid@adaptec.com>
L:      linux-scsi@vger.kernel.org
```

```
W:      http://www.adaptec.com/
S:      Maintained
F:      drivers/scsi/ips*

IPVS
M:      Wensong Zhang <wensong@linux-vs.org>
M:      Simon Horman <horms@verge.net.au>
M:      Julian Anastasov <ja@ssi.bg>
L:      netdev@vger.kernel.org
L:      lvs-devel@vger.kernel.org
S:      Maintained
F:      Documentation/networking/ipvs-sysctl.txt
F:      include/net/ip_vs.h
F:      include/uapi/linux/ip_vs.h
F:      net/netfilter/ipvs/

IPWIRELESS DRIVER
M:      Jiri Kosina <jkosina@suse.cz>
M:      David Sterba <dsterba@suse.cz>
S:      Odd Fixes
F:      drivers/tty/ipwireless/

IPX NETWORK LAYER
M:      Arnaldo Carvalho de Melo <acme@ghostprotocols.net>
L:      netdev@vger.kernel.org
S:      Maintained
F:      include/net/ipx.h
F:      include/uapi/linux/ipx.h
F:      net/ipx/

IRDA SUBSYSTEM
M:      Samuel Ortiz <samuel@sortiz.org>
L:      irda-users@lists.sourceforge.net (subscribers-only)
L:      netdev@vger.kernel.org
W:      http://irda.sourceforge.net/
S:      Maintained
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/sameo/irda-2.6.git
F:      Documentation/networking/irda.txt
F:      drivers/net/irda/
F:      include/net/irda/
F:      net/irda/

IRQ SUBSYSTEM
M:      Thomas Gleixner <tglx@linutronix.de>
S:      Maintained
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tip/tip.git irq/core
F:      kernel/irq/
F:      drivers/irqchip/

IRQ DOMAINS (IRQ NUMBER MAPPING LIBRARY)
M:      Benjamin Herrenschmidt <benh@kernel.crashing.org>
M:      Grant Likely <grant.likely@linaro.org>
T:      git git://git.secretlab.ca/git/linux-2.6.git irqdomain/next
S:      Maintained
F:      Documentation/IRQ-domain.txt
F:      include/linux/irqdomain.h
F:      kernel/irq/irqdomain.c
```

```
ISAPNP
M:      Jaroslav Kysela <perex@perex.cz>
S:      Maintained
F:      Documentation/isapnp.txt
F:      drivers/pnp/isapnp/
F:      include/linux/isapnp.h

ISA RADIO MODULE
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/radio/radio-isa*

iSCSI BOOT FIRMWARE TABLE (iBFT) DRIVER
M:      Peter Jones <pjones@redhat.com>
M:      Konrad Rzeszutek Wilk <konrad@kernel.org>
S:      Maintained
F:      drivers/firmware/iscsi_ibft*

ISCSI
M:      Mike Christie <michaelc@cs.wisc.edu>
L:      open-iscsi@googlegroups.com
W:      www.open-iscsi.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/mnc/linux-2.6-
iscsi.git
S:      Maintained
F:      drivers/scsi/*iscsi*
F:      include/scsi/*iscsi*

ISCSI EXTENSIONS FOR RDMA (ISER) INITIATOR
M:      Or Gerlitz <ogerlitz@mellanox.com>
M:      Roi Dayan <roid@mellanox.com>
L:      linux-rdma@vger.kernel.org
S:      Supported
W:      http://www.openfabrics.org
W:      www.open-iscsi.org
Q:      http://patchwork.kernel.org/project/linux-rdma/list/
F:      drivers/infiniband/ulp/iser

ISDN SUBSYSTEM
M:      Karsten Keil <isdn@linux-pingi.de>
L:      isdn4linux@listserv.isdn4linux.de (subscribers-only)
L:      netdev@vger.kernel.org
W:      http://www.isdn4linux.de
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/kkeil/isdn-2.6.git
S:      Maintained
F:      Documentation/isdn/
F:      drivers/isdn/
F:      include/linux/isdn.h
F:      include/linux/isdn/
F:      include/uapi/linux/isdn.h
F:      include/uapi/linux/isdn/

ISDN SUBSYSTEM (Eicon active card driver)
```

```
M:      Armin Schindler <mac@melware.de>
L:      isdn4linux@listserv.isdn4linux.de (subscribers-only)
W:      http://www.melware.de
S:      Maintained
F:      drivers/isdn/hardware/eicon/

IT87 HARDWARE MONITORING DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/it87
F:      drivers/hwmon/it87.c

IT913X MEDIA DRIVER
M:      Malcolm Priestley <tvboxspy@gmail.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/it913x*

IT913X FE MEDIA DRIVER
M:      Malcolm Priestley <tvboxspy@gmail.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
S:      Maintained
F:      drivers/media/dvb-frontends/it913x-fe*

IT913X MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/tuners/it913x*

IVTV VIDEO4LINUX DRIVER
M:      Andy Walls <awalls@md.metrocast.net>
L:      ivtv-devel@ivtvdriver.org (moderated for non-subscribers)
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://www.ivtvdriver.org
S:      Maintained
F:      Documentation/video4linux/*.ivtv
F:      drivers/media/pci/ivtv/
F:      include/uapi/linux/ivtv*

IX2505V MEDIA DRIVER
M:      Malcolm Priestley <tvboxspy@gmail.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
S:      Maintained
F:      drivers/media/dvb-frontends/ix2505v*
```

```
JC42.4 TEMPERATURE SENSOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/jc42.c
F:      Documentation/hwmon/jc42

JFS FILESYSTEM
M:      Dave Kleikamp <shaggy@kernel.org>
L:      jfs-discussion@lists.sourceforge.net
W:      http://jfs.sourceforge.net/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/shaggy/jfs-2.6.git
S:      Maintained
F:      Documentation/filesystems/jfs.txt
F:      fs/jfs/

JME NETWORK DRIVER
M:      Guo-Fu Tseng <cooldavid@cooldavid.org>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/jme.*

JOURNALLING FLASH FILE SYSTEM V2 (JFFS2)
M:      David Woodhouse <dwmw2@infradead.org>
L:      linux-mtd@lists.infradead.org
W:      http://www.linux-mtd.infradead.org/doc/jffs2.html
S:      Maintained
F:      fs/jffs2/
F:      include/uapi/linux/jffs2.h

JOURNALLING LAYER FOR BLOCK DEVICES (JBD)
M:      Andrew Morton <akpm@linux-foundation.org>
M:      Jan Kara <jack@suse.cz>
L:      linux-ext4@vger.kernel.org
S:      Maintained
F:      fs/jbd/
F:      include/linux/jbd.h

JOURNALLING LAYER FOR BLOCK DEVICES (JBD2)
M:      "Theodore Ts'o" <tytso@mit.edu>
L:      linux-ext4@vger.kernel.org
S:      Maintained
F:      fs/jbd2/
F:      include/linux/jbd2.h

JSM Neo PCI based serial card
M:      Lucas Tavares <lucaskt@linux.vnet.ibm.com>
L:      linux-serial@vger.kernel.org
S:      Maintained
F:      drivers/tty/serial/jsm/

K10TEMP HARDWARE MONITORING DRIVER
M:      Clemens Ladisch <clemens@ladisch.de>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/k10temp
```

```
F:      drivers/hwmon/k10temp.c

K8TEMP HARDWARE MONITORING DRIVER
M:      Rudolf Marek <r.marek@assembler.cz>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/k8temp
F:      drivers/hwmon/k8temp.c

KCONFIG
M:      Michal Marek <mmarek@suse.cz>
L:      linux-kbuild@vger.kernel.org
S:      Odd Fixes
F:      Documentation/kbuild/kconfig-language.txt
F:      scripts/kconfig/

KDUMP
M:      Vivek Goyal <vgoyal@redhat.com>
M:      Haren Myneni <hbabu@us.ibm.com>
L:      kexec@lists.infradead.org
W:      http://lse.sourceforge.net/kdump/
S:      Maintained
F:      Documentation/kdump/

KEENE FM RADIO TRANSMITTER DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/radio/radio-keene*

KERNEL AUTOMOUNTER v4 (AUTOFS4)
M:      Ian Kent <raven@themaw.net>
L:      autofs@vger.kernel.org
S:      Maintained
F:      fs/autofs4/

KERNEL BUILD + files below scripts/ (unless maintained elsewhere)
M:      Michal Marek <mmarek@suse.cz>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/mmarek/kbuild.git
for-next
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/mmarek/kbuild.git
rc-fixes
L:      linux-kbuild@vger.kernel.org
S:      Maintained
F:      Documentation/kbuild/
F:      Makefile
F:      scripts/Makefile.*
F:      scripts/basic/
F:      scripts/mk*
F:      scripts/package/

KERNEL JANITORS
L:      kernel-janitors@vger.kernel.org
W:      http://kernelnewbies.org/KernelJanitors
S:      Odd Fixes
```

```
KERNEL NFSD, SUNRPC, AND LOCKD SERVERS
M:      "J. Bruce Fields" <bfields@fieldses.org>
L:      linux-nfs@vger.kernel.org
W:      http://nfs.sourceforge.net/
S:      Supported
F:      fs/nfsd/
F:      include/linux/nfsd/
F:      include/uapi/linux/nfsd/
F:      fs/lockd/
F:      fs/nfs_common/
F:      net/sunrpc/
F:      include/linux/lockd/
F:      include/linux/sunrpc/
F:      include/uapi/linux/sunrpc/

KERNEL VIRTUAL MACHINE (KVM)
M:      Gleb Natapov <gleb@redhat.com>
M:      Paolo Bonzini <pbonzini@redhat.com>
L:      kvm@vger.kernel.org
W:      http://linux-kvm.org
S:      Supported
F:      Documentation/*/kvm*.txt
F:      Documentation/virtual/kvm/
F:      arch/*/kvm/
F:      arch/*/include/asm/kvm*
F:      include/linux/kvm*
F:      include/uapi/linux/kvm*
F:      virt/kvm/

KERNEL VIRTUAL MACHINE (KVM) FOR AMD-V
M:      Joerg Roedel <joro@8bytes.org>
L:      kvm@vger.kernel.org
W:      http://kvm.qumranet.com
S:      Maintained
F:      arch/x86/include/asm/svm.h
F:      arch/x86/kvm/svm.c

KERNEL VIRTUAL MACHINE (KVM) FOR POWERPC
M:      Alexander Graf <agraf@suse.de>
L:      kvm-ppc@vger.kernel.org
W:      http://kvm.qumranet.com
T:      git git://github.com/agraf/linux-2.6.git
S:      Supported
F:      arch/powerpc/include/asm/kvm*
F:      arch/powerpc/kvm/

KERNEL VIRTUAL MACHINE For Itanium (KVM/IA64)
M:      Xiantao Zhang <xiantao.zhang@intel.com>
L:      kvm-ia64@vger.kernel.org
W:      http://kvm.qumranet.com
S:      Supported
F:      Documentation/ia64/kvm.txt
F:      arch/ia64/include/asm/kvm*
F:      arch/ia64/kvm/

KERNEL VIRTUAL MACHINE for s390 (KVM/s390)
```

```
M:      Christian Borntraeger <borntraeger@de.ibm.com>
M:      Cornelia Huck <cornelia.huck@de.ibm.com>
M:      linux390@de.ibm.com
L:      linux-s390@vger.kernel.org
W:      http://www.ibm.com/developerworks/linux/linux390/
S:      Supported
F:      Documentation/s390/kvm.txt
F:      arch/s390/include/asm/kvm*
F:      arch/s390/kvm/
F:      drivers/s390/kvm/

KERNEL VIRTUAL MACHINE (KVM) FOR ARM
M:      Christoffer Dall <cdall@cs.columbia.edu>
L:      kvmarm@lists.cs.columbia.edu
W:      http://systems.cs.columbia.edu/projects/kvm-arm
S:      Maintained
F:      arch/arm/include/uapi/asm/kvm*
F:      arch/arm/include/asm/kvm*
F:      arch/arm/kvm/

KEXEC
M:      Eric Biederman <ebiederm@xmission.com>
W:      http://kernel.org/pub/linux/utils/kernel/kexec/
L:      kexec@lists.infradead.org
S:      Maintained
F:      include/linux/kexec.h
F:      include/uapi/linux/kexec.h
F:      kernel/kexec.c

KEYS/KEYRINGS:
M:      David Howells <dhowells@redhat.com>
L:      keyrings@linux-nfs.org
S:      Maintained
F:      Documentation/security/keys.txt
F:      include/linux/key.h
F:      include/linux/key-type.h
F:      include/keys/
F:      security/keys/

KEYS-TRUSTED
M:      David Safford <safford@watson.ibm.com>
M:      Mimi Zohar <zohar@us.ibm.com>
L:      linux-security-module@vger.kernel.org
L:      keyrings@linux-nfs.org
S:      Supported
F:      Documentation/security/keys-trusted-encrypted.txt
F:      include/keys/trusted-type.h
F:      security/keys/trusted.c
F:      security/keys/trusted.h

KEYS-ENCRYPTED
M:      Mimi Zohar <zohar@us.ibm.com>
M:      David Safford <safford@watson.ibm.com>
L:      linux-security-module@vger.kernel.org
L:      keyrings@linux-nfs.org
S:      Supported
F:      Documentation/security/keys-trusted-encrypted.txt
```

```
F:      include/keys/encrypted-type.h
F:      security/keys/encrypted-keys/

KGDB / KDB /debug_core
M:      Jason Wessel <jason.wessel@windriver.com>
W:      http://kgdb.wiki.kernel.org/
L:      kgdb-bugreport@lists.sourceforge.net
S:      Maintained
F:      Documentation/DocBook/kgdb.tmpl
F:      drivers/misc/kgdbts.c
F:      drivers/tty/serial/kgdboc.c
F:      include/linux/kdb.h
F:      include/linux/kgdb.h
F:      kernel/debug/

KMEMCHECK
M:      Vegard Nossum <vegardno@ifi.uio.no>
M:      Pekka Enberg <penberg@kernel.org>
S:      Maintained
F:      Documentation/kmemcheck.txt
F:      arch/x86/include/asm/kmemcheck.h
F:      arch/x86/mm/kmemcheck/
F:      include/linux/kmemcheck.h
F:      mm/kmemcheck.c

KMEMLEAK
M:      Catalin Marinas <catalin.marinas@arm.com>
S:      Maintained
F:      Documentation/kmemleak.txt
F:      include/linux/kmemleak.h
F:      mm/kmemleak.c
F:      mm/kmemleak-test.c

KPROBES
M:      Ananth N Mavinakayanahalli <ananth@in.ibm.com>
M:      Anil S Keshavamurthy <anil.s.keshavamurthy@intel.com>
M:      "David S. Miller" <davem@davemloft.net>
M:      Masami Hiramatsu <masami.hiramatsu.pt@hitachi.com>
S:      Maintained
F:      Documentation/kprobes.txt
F:      include/linux/kprobes.h
F:      kernel/kprobes.c

KS0108 LCD CONTROLLER DRIVER
M:      Miguel Ojeda Sandonis <miguel.ojeda.sandonis@gmail.com>
W:      http://miguelojeda.es/auxdisplay.htm
W:      http://jair.lab.fi.uva.es/~migojed/auxdisplay.htm
S:      Maintained
F:      Documentation/auxdisplay/ks0108
F:      drivers/auxdisplay/ks0108.c
F:      include/linux/ks0108.h

LAPB module
L:      linux-x25@vger.kernel.org
S:      Orphan
F:      Documentation/networking/lapb-module.txt
F:      include/*/lapb.h
```

```
F:      net/lapb/

LASI 53c700 driver for PARISC
M:      "James E.J. Bottomley" <James.Bottomley@HansenPartnership.com>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      Documentation/scsi/53c700.txt
F:      drivers/scsi/53c700*

LED SUBSYSTEM
M:      Bryan Wu <cooloney@gmail.com>
M:      Richard Purdie <rpurdie@rpsys.net>
L:      linux-leds@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/cooloney/linux-
leds.git
S:      Maintained
F:      drivers/leds/
F:      include/linux/leds.h

LEGACY EEPROM DRIVER
M:      Jean Delvare <khali@linux-fr.org>
S:      Maintained
F:      Documentation/misc-devices/eeprom
F:      drivers/misc/eeprom/eeprom.c

LEGO USB Tower driver
M:      Juergen Stuber <starblue@users.sourceforge.net>
L:      legousb-devel@lists.sourceforge.net
W:      http://legousb.sourceforge.net/
S:      Maintained
F:      drivers/usb/misc/legousbtower.c

LG2160 MEDIA DRIVER
M:      Michael Krufky <mkrufky@linuxtv.org>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://github.com/mkrufky
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/mkrufky/tuners.git
S:      Maintained
F:      drivers/media/dvb-frontends/lg2160.*

LGDT3305 MEDIA DRIVER
M:      Michael Krufky <mkrufky@linuxtv.org>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://github.com/mkrufky
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/mkrufky/tuners.git
S:      Maintained
F:      drivers/media/dvb-frontends/lgdt3305.*

LGUEST
M:      Rusty Russell <rusty@rustcorp.com.au>
L:      lguest@lists.ozlabs.org
W:      http://lguest.ozlabs.org/
S:      Odd Fixes
```

```
F:      arch/x86/include/asm/lguest*.h
F:      arch/x86/lguest/
F:      drivers/lguest/
F:      include/linux/lguest*.h
F:      tools/lguest/

LINUX FOR IBM pSERIES (RS/6000)
M:      Paul Mackerras <paulus@au.ibm.com>
W:      http://www.ibm.com/linux/ltc/projects/ppc
S:      Supported
F:      arch/powerpc/boot/rs6000.h

LINUX FOR POWERPC (32-BIT AND 64-BIT)
M:      Benjamin Herrenschmidt <benh@kernel.crashing.org>
M:      Paul Mackerras <paulus@samba.org>
W:      http://www.penguinppc.org/
L:      linuxppc-dev@lists.ozlabs.org
Q:      http://patchwork.ozlabs.org/project/linuxppc-dev/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/benh/powerpc.git
S:      Supported
F:      Documentation/powerpc/
F:      arch/powerpc/

LINUX FOR POWER MACINTOSH
M:      Benjamin Herrenschmidt <benh@kernel.crashing.org>
W:      http://www.penguinppc.org/
L:      linuxppc-dev@lists.ozlabs.org
S:      Maintained
F:      arch/powerpc/platforms/powermac/
F:      drivers/macintosh/

LINUX FOR POWERPC EMBEDDED MPC5XXX
M:      Anatolij Gustschin <agust@denx.de>
L:      linuxppc-dev@lists.ozlabs.org
T:      git git://git.denx.de/linux-2.6-agust.git
S:      Maintained
F:      arch/powerpc/platforms/512x/
F:      arch/powerpc/platforms/52xx/

LINUX FOR POWERPC EMBEDDED PPC4XX
M:      Josh Boyer <jwboyer@gmail.com>
M:      Matt Porter <mporter@kernel.crashing.org>
W:      http://www.penguinppc.org/
L:      linuxppc-dev@lists.ozlabs.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jwboyer/powerpc-
4xx.git
S:      Maintained
F:      arch/powerpc/platforms/40x/
F:      arch/powerpc/platforms/44x/

LINUX FOR POWERPC EMBEDDED XILINX VIRTEX
L:      linuxppc-dev@lists.ozlabs.org
S:      Unmaintained
F:      arch/powerpc/*/*virtex*
F:      arch/powerpc/*/*/*virtex*

LINUX FOR POWERPC EMBEDDED PPC8XX
```

```
M:      Vitaly Bordug <vitb@kernel.crashing.org>
M:      Marcelo Tosatti <marcelo@kvack.org>
W:      http://www.penguinppc.org/
L:      linuxppc-dev@lists.ozlabs.org
S:      Maintained
F:      arch/powerpc/platforms/8xx/

LINUX FOR POWERPC EMBEDDED PPC83XX AND PPC85XX
M:      Kumar Gala <galak@kernel.crashing.org>
W:      http://www.penguinppc.org/
L:      linuxppc-dev@lists.ozlabs.org
S:      Maintained
F:      arch/powerpc/platforms/83xx/
F:      arch/powerpc/platforms/85xx/

LINUX FOR POWERPC PA SEMI PWRFICIENT
M:      Olof Johansson <olof@lixom.net>
L:      linuxppc-dev@lists.ozlabs.org
S:      Maintained
F:      arch/powerpc/platforms/pasemi/
F:      drivers/*/*pasemi*
F:      drivers/*/*/*pasemi*

LINUX SECURITY MODULE (LSM) FRAMEWORK
M:      Chris Wright <chrisw@sous-sol.org>
L:      linux-security-module@vger.kernel.org
S:      Supported

LIS3LV02D ACCELEROMETER DRIVER
M:      Eric Piel <eric.piel@tremplin-utc.net>
S:      Maintained
F:      Documentation/misc-devices/lis3lv02d
F:      drivers/misc/lis3lv02d/
F:      drivers/platform/x86/hp_accel.c

LLC (802.2)
M:      Arnaldo Carvalho de Melo <acme@ghostprotocols.net>
S:      Maintained
F:      include/linux/llc.h
F:      include/uapi/linux/llc.h
F:      include/net/llc*
F:      net/llc/

LM73 HARDWARE MONITOR DRIVER
M:      Guillaume Ligneul <guillaume.ligneul@gmail.com>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/lm73.c

LM78 HARDWARE MONITOR DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/lm78
F:      drivers/hwmon/lm78.c

LM83 HARDWARE MONITOR DRIVER
```

```
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/lm83
F:      drivers/hwmon/lm83.c

LM90 HARDWARE MONITOR DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/lm90
F:      drivers/hwmon/lm90.c

LM95234 HARDWARE MONITOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/lm95234
F:      drivers/hwmon/lm95234.c

LME2510 MEDIA DRIVER
M:      Malcolm Priestley <tvboxspy@gmail.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
S:      Maintained
F:      drivers/media/usb/dvb-usb-v2/lmedm04*

LOCKDEP AND LOCKSTAT
M:      Peter Zijlstra <peterz@infradead.org>
M:      Ingo Molnar <mingo@redhat.com>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tip/tip.git
core/locking
S:      Maintained
F:      Documentation/lockdep*.txt
F:      Documentation/lockstat.txt
F:      include/linux/lockdep.h
F:      kernel/lockdep*

LOGICAL DISK MANAGER SUPPORT (LDM, Windows 2000/XP/Vista Dynamic Disks)
M:      "Richard Russon (FlatCap)" <ldm@flatcap.org>
L:      linux-ntfs-dev@lists.sourceforge.net
W:      http://www.linux-ntfs.org/content/view/19/37/
S:      Maintained
F:      Documentation/ldm.txt
F:      block/partitions/ldm.*

LogFS
M:      Joern Engel <joern@logfs.org>
M:      Prasad Joshi <prasadjoshi.linux@gmail.com>
L:      logfs@logfs.org
W:      logfs.org
S:      Maintained
F:      fs/logfs/

LPC32XX MACHINE SUPPORT
M:      Roland Stigge <stigge@antcom.de>
```

```
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/mach-lpc32xx/

LSILOGIC MPT FUSION DRIVERS (FC/SAS/SPI)
M:      Nagalakshmi Nandigama <Nagalakshmi.Nandigama@lsi.com>
M:      Sreekanth Reddy <Sreekanth.Reddy@lsi.com>
M:      support@lsi.com
L:      DL-MPTFusionLinux@lsi.com
L:      linux-scsi@vger.kernel.org
W:      http://www.lsilogic.com/support
S:      Supported
F:      drivers/message/fusion/
F:      drivers/scsi/mpt2sas/
F:      drivers/scsi/mpt3sas/

LSILOGIC/SYMBIOS/NCR 53C8XX and 53C1010 PCI-SCSI drivers
M:      Matthew Wilcox <matthew@wil.cx>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/sym53c8xx_2/

LTC4261 HARDWARE MONITOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/ltc4261
F:      drivers/hwmon/ltc4261.c

LTP (Linux Test Project)
M:      Shubham Goyal <shubham@linux.vnet.ibm.com>
M:      Mike Frysinger <vapier@gentoo.org>
M:      Cyril Hrubis <chrubis@suse.cz>
M:      Caspar Zhang <caspar@casparzhang.com>
M:      Wanlong Gao <gaowanlong@cn.fujitsu.com>
L:      ltp-list@lists.sourceforge.net (subscribers-only)
W:      http://ltp.sourceforge.net/
T:      git git://github.com/linux-test-project/ltp.git
T:      git git://ltp.git.sourceforge.net/gitroot/ltp/ltp-dev
S:      Maintained

M32R ARCHITECTURE
M:      Hirokazu Takata <takata@linux-m32r.org>
L:      linux-m32r@ml.linux-m32r.org (moderated for non-subscribers)
L:      linux-m32r-ja@ml.linux-m32r.org (in Japanese)
W:      http://www.linux-m32r.org/
S:      Maintained
F:      arch/m32r/

M68K ARCHITECTURE
M:      Geert Uytterhoeven <geert@linux-m68k.org>
L:      linux-m68k@lists.linux-m68k.org
W:      http://www.linux-m68k.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/geert/linux-m68k.git
S:      Maintained
F:      arch/m68k/
F:      drivers/zorro/
```

```
M68K ON APPLE MACINTOSH
M:      Joshua Thompson <funaho@jurai.org>
W:      http://www.mac.linux-m68k.org/
L:      linux-m68k@lists.linux-m68k.org
S:      Maintained
F:      arch/m68k/mac/

M68K ON HP9000/300
M:      Philip Blundell <philb@gnu.org>
W:      http://www.tazenda.demon.co.uk/phil/linux-hp
S:      Maintained
F:      arch/m68k/hp300/

M88RS2000 MEDIA DRIVER
M:      Malcolm Priestley <tvboxspy@gmail.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
S:      Maintained
F:      drivers/media/dvb-frontends/m88rs2000*

MA901 MASTERKIT USB FM RADIO DRIVER
M:      Alexey Klimov <klimov.linux@gmail.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/radio/radio-ma901.c

MAC80211
M:      Johannes Berg <johannes@sipsolutions.net>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jberg/mac80211.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jberg/mac80211-
next.git
S:      Maintained
F:      Documentation/networking/mac80211-injection.txt
F:      include/net/mac80211.h
F:      net/mac80211/

MAC80211 PID RATE CONTROL
M:      Stefano Brivio <stefano.brivio@polimi.it>
M:      Mattias Nissler <mattias.nissler@gmx.de>
L:      linux-wireless@vger.kernel.org
W:
        http://wireless.kernel.org/en/developers/Documentation/mac80211/RateCo
ntrol/PID
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jberg/mac80211.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jberg/mac80211-
next.git
S:      Maintained
F:      net/mac80211/rc80211_pid*

MACVLAN DRIVER
M:      Patrick McHardy <kaber@trash.net>
L:      netdev@vger.kernel.org
```

```
S:      Maintained
F:      drivers/net/macvlan.c
F:      include/linux/if_macvlan.h

MAN-PAGES: MANUAL PAGES FOR LINUX -- Sections 2, 3, 4, 5, and 7
M:      Michael Kerrisk <mtk.manpages@gmail.com>
W:      http://www.kernel.org/doc/man-pages
L:      linux-man@vger.kernel.org
S:      Maintained

MARVELL GIGABIT ETHERNET DRIVERS (skge/sky2)
M:      Mirko Lindner <mlindner@marvell.com>
M:      Stephen Hemminger <stephen@networkplumber.org>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/marvell/sk*

MARVELL LIBERTAS WIRELESS DRIVER
L:      libertas-dev@lists.infradead.org
S:      Orphan
F:      drivers/net/wireless/libertas/

MARVELL MV643XX ETHERNET DRIVER
M:      Lennert Buytenhek <buytenh@wantstofly.org>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/marvell/mv643xx_eth.*
F:      include/linux/mv643xx.h

MARVELL MVNETA ETHERNET DRIVER
M:      Thomas Petazzoni <thomas.petazzoni@free-electrons.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/marvell/mvneta.*

MARVELL MWIFIEX WIRELESS DRIVER
M:      Bing Zhao <bzhao@marvell.com>
L:      linux-wireless@vger.kernel.org
S:      Maintained
F:      drivers/net/wireless/mwifiex/

MARVELL MWL8K WIRELESS DRIVER
M:      Lennert Buytenhek <buytenh@wantstofly.org>
L:      linux-wireless@vger.kernel.org
S:      Odd Fixes
F:      drivers/net/wireless/mwl8k.c

MARVELL SOC MMC/SD/SDIO CONTROLLER DRIVER
M:      Nicolas Pitre <nico@fluxnic.net>
S:      Odd Fixes
F:      drivers/mmc/host/mvsdio.*

MATROX FRAMEBUFFER DRIVER
L:      linux-fbdev@vger.kernel.org
S:      Orphan
F:      drivers/video/matrox/matroxfb_*
F:      include/uapi/linux/matroxfb.h
```

```
MAX16065 HARDWARE MONITOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/max16065
F:      drivers/hwmon/max16065.c

MAX6650 HARDWARE MONITOR AND FAN CONTROLLER DRIVER
M:      "Hans J. Koch" <hjk@hansjkoch.de>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/max6650
F:      drivers/hwmon/max6650.c

MAX6697 HARDWARE MONITOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/max6697
F:      Documentation/devicetree/bindings/i2c/max6697.txt
F:      drivers/hwmon/max6697.c
F:      include/linux/platform_data/max6697.h

MAXIRADIO FM RADIO RECEIVER DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/radio/radio-maxiradio*

MEDIA INPUT INFRASTRUCTURE (V4L/DVB)
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
P:      LinuxTV.org Project
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
Q:      http://patchwork.kernel.org/project/linux-media/list/
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      Documentation/dvb/
F:      Documentation/video4linux/
F:      Documentation/DocBook/media/
F:      drivers/media/
F:      drivers/staging/media/
F:      include/media/
F:      include/uapi/linux/dvb/
F:      include/uapi/linux/videodev2.h
F:      include/uapi/linux/media.h
F:      include/uapi/linux/v4l2-*
F:      include/uapi/linux/meye.h
F:      include/uapi/linux/ivtv*
F:      include/uapi/linux/uvcvideo.h

MEDIAVISION PRO MOVIE STUDIO DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
```

```
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Odd Fixes
F:      drivers/media/parport/pms*

MEGARAID SCSI DRIVERS
M:      Neela Syam Kolli <megaraidlinux@lsi.com>
L:      linux-scsi@vger.kernel.org
W:      http://megaraid.lsilogic.com
S:      Maintained
F:      Documentation/scsi/megaraid.txt
F:      drivers/scsi/megaraid.*
F:      drivers/scsi/megaraid/

MELLANOX ETHERNET DRIVER (mlx4_en)
M:      Amir Vadai <amirv@mellanox.com>
L:      netdev@vger.kernel.org
S:      Supported
W:      http://www.mellanox.com
Q:      http://patchwork.ozlabs.org/project/netdev/list/
F:      drivers/net/ethernet/mellanox/mlx4/en_*

MEMORY MANAGEMENT
L:      linux-mm@kvack.org
W:      http://www.linux-mm.org
S:      Maintained
F:      include/linux/mm.h
F:      include/linux/gfp.h
F:      include/linux/mmzone.h
F:      include/linux/memory_hotplug.h
F:      include/linux/vmalloc.h
F:      mm/

MEMORY RESOURCE CONTROLLER
M:      Johannes Weiner <hannes@cmpxchg.org>
M:      Michal Hocko <mhocko@suse.cz>
M:      Balbir Singh <bsingharora@gmail.com>
M:      KAMEZAWA Hiroyuki <kamezawa.hiroyu@jp.fujitsu.com>
L:      cgroups@vger.kernel.org
L:      linux-mm@kvack.org
S:      Maintained
F:      mm/memcontrol.c
F:      mm/page_cgroup.c

MEMORY TECHNOLOGY DEVICES (MTD)
M:      David Woodhouse <dwmw2@infradead.org>
L:      linux-mtd@lists.infradead.org
W:      http://www.linux-mtd.infradead.org/
Q:      http://patchwork.ozlabs.org/project/linux-mtd/list/
T:      git git://git.infradead.org/mtd-2.6.git
S:      Maintained
F:      drivers/mtd/
F:      include/linux/mtd/
F:      include/uapi/mtd/

METAG ARCHITECTURE
M:      James Hogan <james.hogan@imgtec.com>
```

```
S:      Supported
F:      arch/metag/
F:      Documentation/metag/
F:      Documentation/devicetree/bindings/metag/
F:      drivers/clocksource/metag_generic.c
F:      drivers/irqchip/irq-metag.c
F:      drivers/irqchip/irq-metag-ext.c
F:      drivers/tty/metag_da.c
F:      fs/imgdafs/

MICROBLAZE ARCHITECTURE
M:      Michal Simek <monstr@monstr.eu>
L:      microblaze-uclinux@itee.uq.edu.au (moderated for non-subscribers)
W:      http://www.monstr.eu/fdt/
T:      git git://git.monstr.eu/linux-2.6-microblaze.git
S:      Supported
F:      arch/microblaze/

MICROTEK X6 SCANNER
M:      Oliver Neukum <oliver@neukum.org>
S:      Maintained
F:      drivers/usb/image/microtek.*

MIPS
M:      Ralf Baechle <ralf@linux-mips.org>
L:      linux-mips@linux-mips.org
W:      http://www.linux-mips.org/
T:      git git://git.linux-mips.org/pub/scm/ralf/linux.git
Q:      http://patchwork.linux-mips.org/project/linux-mips/list/
S:      Supported
F:      Documentation/mips/
F:      arch/mips/

MIROSOUND PCM20 FM RADIO RECEIVER DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Odd Fixes
F:      drivers/media/radio/radio-miropcm20*

MODULE SUPPORT
M:      Rusty Russell <rusty@rustcorp.com.au>
S:      Maintained
F:      include/linux/module.h
F:      kernel/module.c

MOTION EYE VAIO PICTUREBOOK CAMERA DRIVER
W:      http://popies.net/meye/
S:      Orphan
F:      Documentation/video4linux/meye.txt
F:      drivers/media/pci/meye/
F:      include/uapi/linux/meye.h

MOXA SMARTIO/INDUSTIO/INTELLIO SERIAL CARD
M:      Jiri Slaby <jirislaby@gmail.com>
S:      Maintained
```

```
F:      Documentation/serial/moxa-smartio
F:      drivers/tty/mxser.*

MR800 AVERMEDIA USB FM RADIO DRIVER
M:      Alexey Klimov <klimov.linux@gmail.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/radio/radio-mr800.c

MSI LAPTOP SUPPORT
M:      "Lee, Chun-Yi" <jlee@suse.com>
L:      platform-driver-x86@vger.kernel.org
S:      Maintained
F:      drivers/platform/x86/msi-laptop.c

MSI WMI SUPPORT
M:      Anisse Astier <anisse@astier.eu>
L:      platform-driver-x86@vger.kernel.org
S:      Supported
F:      drivers/platform/x86/msi-wmi.c

MT9M032 SENSOR DRIVER
M:      Laurent Pinchart <laurent.pinchart@ideasonboard.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/i2c/mt9m032.c
F:      include/media/mt9m032.h

MT9P031 SENSOR DRIVER
M:      Laurent Pinchart <laurent.pinchart@ideasonboard.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/i2c/mt9p031.c
F:      include/media/mt9p031.h

MT9T001 SENSOR DRIVER
M:      Laurent Pinchart <laurent.pinchart@ideasonboard.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/i2c/mt9t001.c
F:      include/media/mt9t001.h

MT9V032 SENSOR DRIVER
M:      Laurent Pinchart <laurent.pinchart@ideasonboard.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/i2c/mt9v032.c
F:      include/media/mt9v032.h

MULTIFUNCTION DEVICES (MFD)
M:      Samuel Ortiz <sameo@linux.intel.com>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/sameo/mfd-2.6.git
```

```
S:      Supported
F:      drivers/mfd/

MULTIMEDIA CARD (MMC), SECURE DIGITAL (SD) AND SDIO SUBSYSTEM
M:      Chris Ball <cjb@laptop.org>
L:      linux-mmc@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/cjb/mmc.git
S:      Maintained
F:      drivers/mmc/
F:      include/linux/mmc/
F:      include/uapi/linux/mmc/

MULTIMEDIA CARD (MMC) ETC. OVER SPI
S:      Orphan
F:      drivers/mmc/host/mmc_spi.c
F:      include/linux/spi/mmc_spi.h

MULTISOUND SOUND DRIVER
M:      Andrew Veliath <andrewtv@usa.net>
S:      Maintained
F:      Documentation/sound/oss/MultiSound
F:      sound/oss/msnd*

MULTITECH MULTIPORT CARD (ISICOM)
S:      Orphan
F:      drivers/tty/isicom.c
F:      include/linux/isicom.h

MUSB MULTIPOINT HIGH SPEED DUAL-ROLE CONTROLLER
M:      Felipe Balbi <balbi@ti.com>
L:      linux-usb@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/balbi/usb.git
S:      Maintained
F:      drivers/usb/musb/

MXL5007T MEDIA DRIVER
M:      Michael Krufky <mkrufky@linuxtv.org>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://github.com/mkrufky
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/mkrufky/tuners.git
S:      Maintained
F:      drivers/media/tuners/mxl5007t.*

MYRICOM MYRI-10G 10GbE DRIVER (MYRI10GE)
M:      Andrew Gallatin <gallatin@myri.com>
L:      netdev@vger.kernel.org
W:      http://www.myri.com/scs/download-Myri10GE.html
S:      Supported
F:      drivers/net/ethernet/myricom/myri10ge/

NATSEMI ETHERNET DRIVER (DP8381x)
S:      Orphan
F:      drivers/net/ethernet/natsemi/natsemi.c

NATIVE INSTRUMENTS USB SOUND INTERFACE DRIVER
```

```
M:      Daniel Mack <zonque@gmail.com>
S:      Maintained
L:      alsa-devel@alsa-project.org
W:      http://www.native-instruments.com
F:      sound/usb/caiaq/

NCP FILESYSTEM
M:      Petr Vandrovec <petr@vandrovec.name>
S:      Odd Fixes
F:      fs/ncpfs/

NCR DUAL 700 SCSI DRIVER (MICROCHANNEL)
M:      "James E.J. Bottomley" <James.Bottomley@HansenPartnership.com>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/NCR_D700.*

NCT6775 HARDWARE MONITOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/nct6775
F:      drivers/hwmon/nct6775.c

NETEFFECT IWARP RNIC DRIVER (IW_NES)
M:      Faisal Latif <faisal.latif@intel.com>
L:      linux-rdma@vger.kernel.org
W:      http://www.intel.com/Products/Server/Adapters/Server-Cluster/Server-
Cluster-overview.htm
S:      Supported
F:      drivers/infiniband/hw/nes/

NETEM NETWORK EMULATOR
M:      Stephen Hemminger <stephen@networkplumber.org>
L:      netem@lists.linux-foundation.org
S:      Maintained
F:      net/sched/sch_netem.c

NETERION 10GbE DRIVERS (s2io/vxge)
M:      Jon Mason <jdmason@kudzu.us>
L:      netdev@vger.kernel.org
S:      Supported
F:      Documentation/networking/s2io.txt
F:      Documentation/networking/vxge.txt
F:      drivers/net/ethernet/neterion/

NETFILTER/IPTABLES
M:      Pablo Neira Ayuso <pablo@netfilter.org>
M:      Patrick McHardy <kaber@trash.net>
M:      Jozsef Kadlecsik <kadlec@blackhole.kfki.hu>
L:      netfilter-devel@vger.kernel.org
L:      netfilter@vger.kernel.org
L:      coreteam@netfilter.org
W:      http://www.netfilter.org/
W:      http://www.iptables.org/
Q:      http://patchwork.ozlabs.org/project/netfilter-devel/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/pablo/nf.git
```

```
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/pablo/nf-next.git
S:      Supported
F:      include/linux/netfilter*
F:      include/linux/netfilter/
F:      include/net/netfilter/
F:      include/uapi/linux/netfilter*
F:      include/uapi/linux/netfilter/
F:      net/*/netfilter.c
F:      net/*/netfilter/
F:      net/netfilter/

NETLABEL
M:      Paul Moore <paul@paul-moore.com>
W:      http://netlabel.sf.net
L:      netdev@vger.kernel.org
S:      Maintained
F:      Documentation/netlabel/
F:      include/net/netlabel.h
F:      net/netlabel/

NETROM NETWORK LAYER
M:      Ralf Baechle <ralf@linux-mips.org>
L:      linux-hams@vger.kernel.org
W:      http://www.linux-ax25.org/
S:      Maintained
F:      include/net/netrom.h
F:      include/uapi/linux/netrom.h
F:      net/netrom/

NETWORK BLOCK DEVICE (NBD)
M:      Paul Clements <Paul.Clements@steeleye.com>
S:      Maintained
L:      nbd-general@lists.sourceforge.net
F:      Documentation/blockdev/nbd.txt
F:      drivers/block/nbd.c
F:      include/linux/nbd.h
F:      include/uapi/linux/nbd.h

NETWORK DROP MONITOR
M:      Neil Horman <nhorman@tuxdriver.com>
L:      netdev@vger.kernel.org
S:      Maintained
W:      https://fedorahosted.org/dropwatch/
F:      net/core/drop_monitor.c

NETWORKING [GENERAL]
M:      "David S. Miller" <davem@davemloft.net>
L:      netdev@vger.kernel.org
W:      http://www.linuxfoundation.org/en/Net
Q:      http://patchwork.ozlabs.org/project/netdev/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/net.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/net-next.git
S:      Maintained
F:      net/
F:      include/net/
F:      include/linux/in.h
F:      include/linux/net.h
```

```
F:      include/linux/netdevice.h
F:      include/uapi/linux/in.h
F:      include/uapi/linux/net.h
F:      include/uapi/linux/netdevice.h

NETWORKING [IPv4/IPv6]
M:      "David S. Miller" <davem@davemloft.net>
M:      Alexey Kuznetsov <kuznet@ms2.inr.ac.ru>
M:      James Morris <jmorris@namei.org>
M:      Hideaki YOSHIFUJI <yoshfuji@linux-ipv6.org>
M:      Patrick McHardy <kaber@trash.net>
L:      netdev@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/net.git
S:      Maintained
F:      net/ipv4/
F:      net/ipv6/
F:      include/net/ip*
F:      arch/x86/net/*

NETWORKING [IPSEC]
M:      Steffen Klassert <steffen.klassert@secunet.com>
M:      Herbert Xu <herbert@gondor.apana.org.au>
M:      "David S. Miller" <davem@davemloft.net>
L:      netdev@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/net.git
S:      Maintained
F:      net/xfrm/
F:      net/key/
F:      net/ipv4/xfrm*
F:      net/ipv6/xfrm*
F:      include/uapi/linux/xfrm.h
F:      include/net/xfrm.h

NETWORKING [LABELED] (NetLabel, CIPSO, Labeled IPsec, SECMARK)
M:      Paul Moore <paul@paul-moore.com>
L:      netdev@vger.kernel.org
S:      Maintained

NETWORKING [WIRELESS]
M:      "John W. Linville" <linville@tuxdriver.com>
L:      linux-wireless@vger.kernel.org
Q:      http://patchwork.kernel.org/project/linux-wireless/list/
T:      git
git://git.kernel.org/pub/scm/linux/kernel/git/linville/wireless.git
S:      Maintained
F:      net/mac80211/
F:      net/rfkill/
F:      net/wireless/
F:      include/net/ieee80211*
F:      include/linux/wireless.h
F:      include/uapi/linux/wireless.h
F:      include/net/iw_handler.h
F:      drivers/net/wireless/

NETWORKING DRIVERS
L:      netdev@vger.kernel.org
W:      http://www.linuxfoundation.org/en/Net
```

```
Q:      http://patchwork.ozlabs.org/project/netdev/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/net.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/net-next.git
S:      Odd Fixes
F:      drivers/net/
F:      include/linux/if_*
F:      include/linux/netdevice.h
F:      include/linux/arcdevice.h
F:      include/linux/etherdevice.h
F:      include/linux/fcdevice.h
F:      include/linux/fddidevice.h
F:      include/linux/hippidevice.h
F:      include/linux/inetdevice.h
F:      include/uapi/linux/if_*
F:      include/uapi/linux/netdevice.h

NETXEN (1/10) GbE SUPPORT
M:      Manish Chopra <manish.chopra@qlogic.com>
M:      Sony Chacko <sony.chacko@qlogic.com>
M:      Rajesh Borundia <rajesh.borundia@qlogic.com>
L:      netdev@vger.kernel.org
W:      http://www.qlogic.com
S:      Supported
F:      drivers/net/ethernet/qlogic/netxen/

NFC SUBSYSTEM
M:      Lauro Ramos Venancio <lauro.venancio@openbossa.org>
M:      Aloisio Almeida Jr <aloisio.almeida@openbossa.org>
M:      Samuel Ortiz <sameo@linux.intel.com>
L:      linux-wireless@vger.kernel.org
L:      linux-nfc@lists.01.org (moderated for non-subscribers)
S:      Maintained
F:      net/nfc/
F:      include/net/nfc/
F:      include/uapi/linux/nfc.h
F:      drivers/nfc/
F:      include/linux/platform_data/pn544.h

NFS, SUNRPC, AND LOCKD CLIENTS
M:      Trond Myklebust <Trond.Myklebust@netapp.com>
L:      linux-nfs@vger.kernel.org
W:      http://client.linux-nfs.org
T:      git git://git.linux-nfs.org/pub/linux/nfs-2.6.git
S:      Maintained
F:      fs/lockd/
F:      fs/nfs/
F:      fs/nfs_common/
F:      net/sunrpc/
F:      include/linux/lockd/
F:      include/linux/nfs*
F:      include/linux/sunrpc/
F:      include/uapi/linux/nfs*
F:      include/uapi/linux/sunrpc/

NILFS2 FILESYSTEM
M:      KONISHI Ryusuke <konishi.ryusuke@lab.ntt.co.jp>
L:      linux-nilfs@vger.kernel.org
```

```
W:      http://www.nilfs.org/en/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/ryusuke/nilfs2.git
S:      Supported
F:      Documentation/filesystems/nilfs2.txt
F:      fs/nilfs2/
F:      include/linux/nilfs2_fs.h

NINJA SCSI-3 / NINJA SCSI-32Bi (16bit/CardBus) PCMCIA SCSI HOST ADAPTER
DRIVER
M:      YOKOTA Hiroshi <yokota@netlab.is.tsukuba.ac.jp>
W:      http://www.netlab.is.tsukuba.ac.jp/~yokota/izumi/ninja/
S:      Maintained
F:      Documentation/scsi/NinjaSCSI.txt
F:      drivers/scsi/pcmcia/nsp_*

NINJA SCSI-32Bi/UDE PCI/CARDBUS SCSI HOST ADAPTER DRIVER
M:      GOTO Masanori <gotom@debian.or.jp>
M:      YOKOTA Hiroshi <yokota@netlab.is.tsukuba.ac.jp>
W:      http://www.netlab.is.tsukuba.ac.jp/~yokota/izumi/ninja/
S:      Maintained
F:      Documentation/scsi/NinjaSCSI.txt
F:      drivers/scsi/nsp32*

NTB DRIVER
M:      Jon Mason <jon.mason@intel.com>
S:      Supported
F:      drivers/ntb/
F:      drivers/net/ntb_netdev.c
F:      include/linux/ntb.h

NTFS FILESYSTEM
M:      Anton Altaparmakov <anton@tuxera.com>
L:      linux-ntfs-dev@lists.sourceforge.net
W:      http://www.tuxera.com/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/aia21/ntfs.git
S:      Supported
F:      Documentation/filesystems/ntfs.txt
F:      fs/ntfs/

NVIDIA (rivafb and nvidiafb) FRAMEBUFFER DRIVER
M:      Antonino Daplas <adaplas@gmail.com>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/riva/
F:      drivers/video/nvidia/

NVM EXPRESS DRIVER
M:      Matthew Wilcox <willy@linux.intel.com>
L:      linux-nvme@lists.infradead.org
T:      git git://git.infradead.org/users/willy/linux-nvme.git
S:      Supported
F:      drivers/block/nvme*
F:      include/linux/nvme.h

OMAP SUPPORT
M:      Tony Lindgren <tony@atomide.com>
L:      linux-omap@vger.kernel.org
```

```
W:      http://www.muru.com/linux/omap/
W:      http://linux.omap.com/
Q:      http://patchwork.kernel.org/project/linux-omap/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tmlind/linux-
omap.git
S:      Maintained
F:      arch/arm/*omap*/
F:      drivers/i2c/busses/i2c-omap.c
F:      include/linux/i2c-omap.h

OMAP DEVICE TREE SUPPORT
M:      Benoît Cousson <b-cousson@ti.com>
M:      Tony Lindgren <tony@atomide.com>
L:      linux-omap@vger.kernel.org
L:      devicetree-discuss@lists.ozlabs.org (moderated for non-subscribers)
S:      Maintained
F:      arch/arm/boot/dts/*omap*
F:      arch/arm/boot/dts/*am3*

OMAP CLOCK FRAMEWORK SUPPORT
M:      Paul Walmsley <paul@pwsan.com>
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      arch/arm/*omap*/*clock*

OMAP POWER MANAGEMENT SUPPORT
M:      Kevin Hilman <khilman@deeprootsystems.com>
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      arch/arm/*omap*/*pm*
F:      drivers/cpufreq/omap-cpufreq.c

OMAP POWERDOMAIN/CLOCKDOMAIN SOC ADAPTATION LAYER SUPPORT
M:      Rajendra Nayak <rnayak@ti.com>
M:      Paul Walmsley <paul@pwsan.com>
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      arch/arm/mach-omap2/powerdomain2xxx_3xxx.c
F:      arch/arm/mach-omap2/powerdomain44xx.c
F:      arch/arm/mach-omap2/clockdomain2xxx_3xxx.c
F:      arch/arm/mach-omap2/clockdomain44xx.c

OMAP AUDIO SUPPORT
M:      Peter Ujfalusi <peter.ujfalusi@ti.com>
M:      Jarkko Nikula <jarkko.nikula@bitmer.com>
L:      alsa-devel@alsa-project.org (subscribers-only)
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      sound/soc/omap/

OMAP FRAMEBUFFER SUPPORT
M:      Tomi Valkeinen <tomi.valkeinen@ti.com>
L:      linux-fbdev@vger.kernel.org
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      drivers/video/omap/
```

```
OMAP DISPLAY SUBSYSTEM and FRAMEBUFFER SUPPORT (DSS2)
M:      Tomi Valkeinen <tomi.valkeinen@ti.com>
L:      linux-omap@vger.kernel.org
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/omap2/
F:      Documentation/arm/OMAP/DSS

OMAP HARDWARE SPINLOCK SUPPORT
M:      Ohad Ben-Cohen <ohad@wizery.com>
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      drivers/hwspinlock/omap_hwspinlock.c
F:      arch/arm/mach-omap2/hwspinlock.c

OMAP MMC SUPPORT
M:      Jarkko Lavinen <jarkko.lavinen@nokia.com>
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      drivers/mmc/host/omap.c

OMAP HS MMC SUPPORT
M:      Balaji T K <balajitk@ti.com>
L:      linux-mmc@vger.kernel.org
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      drivers/mmc/host/omap_hsmmc.c

OMAP RANDOM NUMBER GENERATOR SUPPORT
M:      Deepak Saxena <dsaxena@plexity.net>
S:      Maintained
F:      drivers/char/hw_random/omap-rng.c

OMAP HWMOD SUPPORT
M:      Benoît Cousson <b-cousson@ti.com>
M:      Paul Walmsley <paul@pwsan.com>
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      arch/arm/mach-omap2/omap_hwmod.*

OMAP HWMOD DATA FOR OMAP4-BASED DEVICES
M:      Benoît Cousson <b-cousson@ti.com>
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      arch/arm/mach-omap2/omap_hwmod_44xx_data.c

OMAP IMAGE SIGNAL PROCESSOR (ISP)
M:      Laurent Pinchart <laurent.pinchart@ideasonboard.com>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/platform/omap3isp/

OMAP USB SUPPORT
M:      Felipe Balbi <balbi@ti.com>
L:      linux-usb@vger.kernel.org
L:      linux-omap@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/balbi/usb.git
```

```
S:      Maintained
F:      drivers/usb/*/*omap*
F:      arch/arm/*omap*/usb*

OMAP GPIO DRIVER
M:      Santosh Shilimkar <santosh.shilimkar@ti.com>
M:      Kevin Hilman <khilman@deeprootsystems.com>
L:      linux-omap@vger.kernel.org
S:      Maintained
F:      drivers/gpio/gpio-omap.c

OMFS FILESYSTEM
M:      Bob Copeland <me@bobcopeland.com>
L:      linux-karma-devel@lists.sourceforge.net
S:      Maintained
F:      Documentation/filesystems/omfs.txt
F:      fs/omfs/

OMNIKEY CARDMAN 4000 DRIVER
M:      Harald Welte <laforge@gnumonks.org>
S:      Maintained
F:      drivers/char/pcmcia/cm4000_cs.c
F:      include/linux/cm4000_cs.h
F:      include/uapi/linux/cm4000_cs.h

OMNIKEY CARDMAN 4040 DRIVER
M:      Harald Welte <laforge@gnumonks.org>
S:      Maintained
F:      drivers/char/pcmcia/cm4040_cs.*

OMNIVISION OV7670 SENSOR DRIVER
M:      Jonathan Corbet <corbet@lwn.net>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/i2c/ov7670.c

ONENAND FLASH DRIVER
M:      Kyungmin Park <kyungmin.park@samsung.com>
L:      linux-mtd@lists.infradead.org
S:      Maintained
F:      drivers/mtd/onenand/
F:      include/linux/mtd/onenand*.h

ONSTREAM SCSI TAPE DRIVER
M:      Willem Riede <osst@riede.org>
L:      osst-users@lists.sourceforge.net
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/osst*
F:      drivers/scsi/st*

OPENCORES I2C BUS DRIVER
M:      Peter Korsgaard <jacmet@sunsite.dk>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      Documentation/i2c/busses/i2c-ocores
```

```
F:      drivers/i2c/busses/i2c-ocores.c

OPEN FIRMWARE AND FLATTENED DEVICE TREE
M:      Grant Likely <grant.likely@linaro.org>
M:      Rob Herring <rob.herring@calxeda.com>
L:      devicetree-discuss@lists.ozlabs.org (moderated for non-subscribers)
W:      http://fdt.secretlab.ca
T:      git git://git.secretlab.ca/git/linux-2.6.git
S:      Maintained
F:      Documentation/devicetree
F:      drivers/of
F:      include/linux/of*.h
F:      scripts/dtc
K:      of_get_property
K:      of_match_table

OPENRISC ARCHITECTURE
M:      Jonas Bonn <jonas@southpole.se>
W:      http://openrisc.net
L:      linux@lists.openrisc.net (moderated for non-subscribers)
S:      Maintained
T:      git git://openrisc.net/~jonas/linux
F:      arch/openrisc

OPENVSWITCH
M:      Jesse Gross <jesse@nicira.com>
L:      dev@openvswitch.org
W:      http://openvswitch.org
T:      git
git://git.kernel.org/pub/scm/linux/kernel/git/jesse/openvswitch.git
S:      Maintained
F:      net/openvswitch/

OPL4 DRIVER
M:      Clemens Ladisch <clemens@ladisch.de>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
T:      git git://git.alsa-project.org/alsa-kernel.git
S:      Maintained
F:      sound/drivers/opl4/

OPROFILE
M:      Robert Richter <rric@kernel.org>
L:      oprofile-list@lists.sf.net
S:      Maintained
F:      arch/*/include/asm/oprofile*.h
F:      arch/*/oprofile/
F:      drivers/oprofile/
F:      include/linux/oprofile.h

ORACLE CLUSTER FILESYSTEM 2 (OCFS2)
M:      Mark Fasheh <mfasheh@suse.com>
M:      Joel Becker <jlbec@evilplan.org>
L:      ocfs2-devel@oss.oracle.com (moderated for non-subscribers)
W:      http://oss.oracle.com/projects/ocfs2/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jlbec/ocfs2.git
S:      Supported
F:      Documentation/filesystems/ocfs2.txt
```

```
F:      Documentation/filesystems/dlmfs.txt
F:      fs/ocfs2/

ORINOCO DRIVER
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/en/users/Drivers/orinoco
W:      http://www.nongnu.org/orinoco/
S:      Orphan
F:      drivers/net/wireless/orinoco/

OSD LIBRARY and FILESYSTEM
M:      Boaz Harrosh <bharrosh@panasas.com>
M:      Benny Halevy <bhalevy@tonian.com>
L:      osd-dev@open-osd.org
W:      http://open-osd.org
T:      git git://git.open-osd.org/open-osd.git
S:      Maintained
F:      drivers/scsi/osd/
F:      include/scsi/osd_*
F:      fs/exofs/

P54 WIRELESS DRIVER
M:      Christian Lamparter <chunkeey@googlemail.com>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/en/users/Drivers/p54
S:      Maintained
F:      drivers/net/wireless/p54/

PA SEMI ETHERNET DRIVER
M:      Olof Johansson <olof@lixom.net>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/pasemi/*

PA SEMI SMBUS DRIVER
M:      Olof Johansson <olof@lixom.net>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      drivers/i2c/busses/i2c-pasemi.c

PADATA PARALLEL EXECUTION MECHANISM
M:      Steffen Klassert <steffen.klassert@secunet.com>
L:      linux-crypto@vger.kernel.org
S:      Maintained
F:      kernel/padata.c
F:      include/linux/padata.h
F:      Documentation/padata.txt

PANASONIC LAPTOP ACPI EXTRAS DRIVER
M:      Harald Welte <laforge@gnumonks.org>
L:      platform-driver-x86@vger.kernel.org
S:      Maintained
F:      drivers/platform/x86/panasonic-laptop.c

PANASONIC MN10300/AM33/AM34 PORT
M:      David Howells <dhowells@redhat.com>
M:      Koichi Yasutake <yasutake.koichi@jp.panasonic.com>
```

```
L:      linux-am33-list@redhat.com (moderated for non-subscribers)
W:      ftp://ftp.redhat.com/pub/redhat/gnupro/AM33/
S:      Maintained
F:      Documentation/mn10300/
F:      arch/mn10300/

PARALLEL PORT SUPPORT
L:      linux-parport@lists.infradead.org (subscribers-only)
S:      Orphan
F:      drivers/parport/
F:      include/linux/parport*.h
F:      drivers/char/ppdev.c
F:      include/uapi/linux/ppdev.h

PARAVIRT_OPS INTERFACE
M:      Jeremy Fitzhardinge <jeremy@goop.org>
M:      Chris Wright <chrisw@sous-sol.org>
M:      Alok Kataria <akataria@vmware.com>
M:      Rusty Russell <rusty@rustcorp.com.au>
L:      virtualization@lists.linux-foundation.org
S:      Supported
F:      Documentation/ia64/paravirt_ops.txt
F:      arch/*/kernel/paravirt*
F:      arch/*/include/asm/paravirt.h

PARIDE DRIVERS FOR PARALLEL PORT IDE DEVICES
M:      Tim Waugh <tim@cyberelk.net>
L:      linux-parport@lists.infradead.org (subscribers-only)
W:      http://www.torque.net/linux-pp.html
S:      Maintained
F:      Documentation/blockdev/paride.txt
F:      drivers/block/paride/

PARISC ARCHITECTURE
M:      "James E.J. Bottomley" <jejb@parisc-linux.org>
M:      Helge Deller <deller@gmx.de>
L:      linux-parisc@vger.kernel.org
W:      http://www.parisc-linux.org/
Q:      http://patchwork.kernel.org/project/linux-parisc/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jejb/parisc-2.6.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/deller/parisc-
linux.git
S:      Maintained
F:      arch/parisc/
F:      Documentation/parisc/
F:      drivers/parisc/
F:      drivers/char/agp/parisc-agp.c
F:      drivers/input/serio/gscps2.c
F:      drivers/parport/parport_gsc.*
F:      drivers/tty/serial/8250/8250_gsc.c
F:      drivers/video/sti*
F:      drivers/video/console/sti*
F:      drivers/video/logo/logo_parisc*

PC87360 HARDWARE MONITORING DRIVER
M:      Jim Cromie <jim.cromie@gmail.com>
L:      lm-sensors@lm-sensors.org
```

```
S:      Maintained
F:      Documentation/hwmon/pc87360
F:      drivers/hwmon/pc87360.c

PC8736x GPIO DRIVER
M:      Jim Cromie <jim.cromie@gmail.com>
S:      Maintained
F:      drivers/char/pc8736x_gpio.c

PC87427 HARDWARE MONITORING DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/pc87427
F:      drivers/hwmon/pc87427.c

PCA9532 LED DRIVER
M:      Riku Voipio <riku.voipio@iki.fi>
S:      Maintained
F:      drivers/leds/leds-pca9532.c
F:      include/linux/leds-pca9532.h

PCA9541 I2C BUS MASTER SELECTOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      drivers/i2c/muxes/i2c-mux-pca9541.c

PCDP - PRIMARY CONSOLE AND DEBUG PORT
M:      Khalid Aziz <khalid@gonehiking.org>
S:      Maintained
F:      drivers/firmware/pcdp.*

PCI ERROR RECOVERY
M:      Linas Vepstas <linasvepstas@gmail.com>
L:      linux-pci@vger.kernel.org
S:      Supported
F:      Documentation/PCI/pci-error-recovery.txt
F:      Documentation/powerpc/eeh-pci-error-recovery.txt

PCI SUBSYSTEM
M:      Bjorn Helgaas <bhelgaas@google.com>
L:      linux-pci@vger.kernel.org
Q:      http://patchwork.ozlabs.org/project/linux-pci/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/helgaas/pci.git
S:      Supported
F:      Documentation/PCI/
F:      drivers/pci/
F:      include/linux/pci*

PCMCIA SUBSYSTEM
P:      Linux PCMCIA Team
L:      linux-pcmcia@lists.infradead.org
W:      http://lists.infradead.org/mailman/listinfo/linux-pcmcia
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/brodo/pcmcia-2.6.git
S:      Maintained
F:      Documentation/pcmcia/
```

```
F:      drivers/pcmcia/
F:      include/pcmcia/

PCNET32 NETWORK DRIVER
M:      Don Fry <pcnet32@frontier.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/amd/pcnet32.c

PCRYPT PARALLEL CRYPTO ENGINE
M:      Steffen Klassert <steffen.klassert@secunet.com>
L:      linux-crypto@vger.kernel.org
S:      Maintained
F:      crypto/pcrypt.c
F:      include/crypto/pcrypt.h

PER-CPU MEMORY ALLOCATOR
M:      Tejun Heo <tj@kernel.org>
M:      Christoph Lameter <cl@linux-foundation.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tj/percpu.git
S:      Maintained
F:      include/linux/percpu*.h
F:      mm/percpu*.c
F:      arch/*/include/asm/percpu.h

PER-TASK DELAY ACCOUNTING
M:      Balbir Singh <bsingharora@gmail.com>
S:      Maintained
F:      include/linux/delayacct.h
F:      kernel/delayacct.c

PERFORMANCE EVENTS SUBSYSTEM
M:      Peter Zijlstra <a.p.zijlstra@chello.nl>
M:      Paul Mackerras <paulus@samba.org>
M:      Ingo Molnar <mingo@redhat.com>
M:      Arnaldo Carvalho de Melo <acme@ghostprotocols.net>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tip/tip.git
perf/core
S:      Supported
F:      kernel/events/*
F:      include/linux/perf_event.h
F:      include/uapi/linux/perf_event.h
F:      arch/*/kernel/perf_event*.c
F:      arch/*/kernel/*/perf_event*.c
F:      arch/*/kernel/*/*/perf_event*.c
F:      arch/*/include/asm/perf_event.h
F:      arch/*/kernel/perf_callchain.c
F:      tools/perf/

PERSONALITY HANDLING
M:      Christoph Hellwig <hch@infradead.org>
L:      linux-abi-devel@lists.sourceforge.net
S:      Maintained
F:      include/linux/personality.h
F:      include/uapi/linux/personality.h

PHONET PROTOCOL
```

```
M:      Remi Denis-Courmont <courmisch@gmail.com>
S:      Supported
F:      Documentation/networking/phonet.txt
F:      include/linux/phonet.h
F:      include/net/phonet/
F:      include/uapi/linux/phonet.h
F:      net/phonet/

PHRAM MTD DRIVER
M:      Joern Engel <joern@lazybastard.org>
L:      linux-mtd@lists.infradead.org
S:      Maintained
F:      drivers/mtd/devices/phram.c

PICOLCD HID DRIVER
M:      Bruno Prémont <bonbons@linux-vserver.org>
L:      linux-input@vger.kernel.org
S:      Maintained
F:      drivers/hid/hid-picolcd*

PICOXCELL SUPPORT
M:      Jamie Iles <jamie@jamieiles.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
T:      git git://github.com/jamieiles/linux-2.6-ji.git
S:      Supported
F:      arch/arm/mach-picoxcell
F:      drivers/*/picoxcell*
F:      drivers/*/*/picoxcell*

PIN CONTROL SUBSYSTEM
M:      Linus Walleij <linus.walleij@linaro.org>
S:      Maintained
F:      drivers/pinctrl/
F:      include/linux/pinctrl/

PIN CONTROLLER - ATMEL AT91
M:      Jean-Christophe Plagniol-Villard <plagnioj@jcrosoft.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Maintained
F:      drivers/pinctrl/pinctrl-at91.c

PIN CONTROLLER - ST SPEAR
M:      Viresh Kumar <viresh.linux@gmail.com>
L:      spear-devel@list.st.com
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.st.com/spear
S:      Maintained
F:      drivers/pinctrl/spear/

PKTCDVD DRIVER
M:      Jiri Kosina <jkosina@suse.cz>
S:      Maintained
F:      drivers/block/pktcdvd.c
F:      include/linux/pktcdvd.h
F:      include/uapi/linux/pktcdvd.h

PKUNITY SOC DRIVERS
```

```
M:      Guan Xuetao <gxt@mprc.pku.edu.cn>
W:      http://mprc.pku.edu.cn/~guanxuetao/linux
S:      Maintained
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/epip/linux-2.6-
unicore32.git
F:      drivers/input/serio/i8042-unicore32io.h
F:      drivers/i2c/busses/i2c-puv3.c
F:      drivers/video/fb-puv3.c
F:      drivers/rtc/rtc-puv3.c

PMBUS HARDWARE MONITORING DRIVERS
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
W:      http://www.lm-sensors.org/
W:      http://www.roeck-us.net/linux/drivers/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/groeck/linux-
staging.git
S:      Maintained
F:      Documentation/hwmon/pmbus
F:      drivers/hwmon/pmbus/
F:      include/linux/i2c/pmbus.h

PMC SIERRA MaxRAID DRIVER
M:      Anil Ravindranath <anil_ravindranath@pmc-sierra.com>
L:      linux-scsi@vger.kernel.org
W:      http://www.pmc-sierra.com/
S:      Supported
F:      drivers/scsi/pmcraid.*

PMC SIERRA PM8001 DRIVER
M:      xjtuwjp@gmail.com
M:      lindar_liu@usish.com
L:      linux-scsi@vger.kernel.org
S:      Supported
F:      drivers/scsi/pm8001/

POSIX CLOCKS and TIMERS
M:      Thomas Gleixner <tglx@linutronix.de>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tip/tip.git
timers/core
S:      Supported
F:      fs/timerfd.c
F:      include/linux/timer*
F:      kernel/*timer*

POWER SUPPLY CLASS/SUBSYSTEM and DRIVERS
M:      Anton Vorontsov <cbou@mail.ru>
M:      David Woodhouse <dwmw2@infradead.org>
T:      git git://git.infradead.org/battery-2.6.git
S:      Maintained
F:      include/linux/power_supply.h
F:      drivers/power/

PNP SUPPORT
M:      Rafael J. Wysocki <rafael.j.wysocki@intel.com>
M:      Bjorn Helgaas <bhelgaas@google.com>
S:      Maintained
```

```
F:      drivers/pnp/

PNXxxxx I2C DRIVER
M:      Vitaly Wool <vitalywool@gmail.com>
L:      linux-i2c@vger.kernel.org
S:      Maintained
F:      drivers/i2c/busses/i2c-pnx.c

PPP PROTOCOL DRIVERS AND COMPRESSORS
M:      Paul Mackerras <paulus@samba.org>
L:      linux-ppp@vger.kernel.org
S:      Maintained
F:      drivers/net/ppp/ppp_*

PPP OVER ATM (RFC 2364)
M:      Mitchell Blank Jr <mitch@sfgoth.com>
S:      Maintained
F:      net/atm/pppoatm.c
F:      include/uapi/linux/atmppp.h

PPP OVER ETHERNET
M:      Michal Ostrowski <mostrows@earthlink.net>
S:      Maintained
F:      drivers/net/ppp/pppoe.c
F:      drivers/net/ppp/pppox.c

PPP OVER L2TP
M:      James Chapman <jchapman@katalix.com>
S:      Maintained
F:      net/l2tp/l2tp_ppp.c
F:      include/linux/if_pppol2tp.h
F:      include/uapi/linux/if_pppol2tp.h

PPS SUPPORT
M:      Rodolfo Giometti <giometti@enneenne.com>
W:      http://wiki.enneenne.com/index.php/LinuxPPS_support
L:      linuxpps@ml.enneenne.com (subscribers-only)
S:      Maintained
F:      Documentation/pps/
F:      drivers/pps/
F:      include/linux/pps*.h

PPTP DRIVER
M:      Dmitry Kozlov <xeb@mail.ru>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ppp/pptp.c
W:      http://sourceforge.net/projects/accel-pptp

PREEMPTIBLE KERNEL
M:      Robert Love <rml@tech9.net>
L:      kpreempt-tech@lists.sourceforge.net
W:      ftp://ftp.kernel.org/pub/linux/kernel/people/rml/preempt-kernel
S:      Supported
F:      Documentation/preempt-locking.txt
F:      include/linux/preempt.h
```

```
PRISM54 WIRELESS DRIVER
M:      "Luis R. Rodriguez" <mcgrof@gmail.com>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/en/users/Drivers/p54
S:      Obsolete
F:      drivers/net/wireless/prism54/

PROMISE SATA TX2/TX4 CONTROLLER LIBATA DRIVER
M:      Mikael Pettersson <mikpe@it.uu.se>
L:      linux-ide@vger.kernel.org
S:      Maintained
F:      drivers/ata/sata_promise.*

PS3 NETWORK SUPPORT
M:      Geoff Levand <geoff@infradead.org>
L:      netdev@vger.kernel.org
L:      cbe-oss-dev@lists.ozlabs.org
S:      Maintained
F:      drivers/net/ethernet/toshiba/ps3_gelic_net.*

PS3 PLATFORM SUPPORT
M:      Geoff Levand <geoff@infradead.org>
L:      linuxppc-dev@lists.ozlabs.org
L:      cbe-oss-dev@lists.ozlabs.org
S:      Maintained
F:      arch/powerpc/boot/ps3*
F:      arch/powerpc/include/asm/lv1call.h
F:      arch/powerpc/include/asm/ps3*.h
F:      arch/powerpc/platforms/ps3/
F:      drivers/*/ps3*
F:      drivers/ps3/
F:      drivers/rtc/rtc-ps3.c
F:      drivers/usb/host/*ps3.c
F:      sound/ppc/snd_ps3*

PS3VRAM DRIVER
M:      Jim Paris <jim@jtan.com>
L:      cbe-oss-dev@lists.ozlabs.org
S:      Maintained
F:      drivers/block/ps3vram.c

PSTORE FILESYSTEM
M:      Anton Vorontsov <cbouatmailru@gmail.com>
M:      Colin Cross <ccross@android.com>
M:      Kees Cook <keescook@chromium.org>
M:      Tony Luck <tony.luck@intel.com>
S:      Maintained
T:      git git://git.infradead.org/users/cbou/linux-pstore.git
F:      fs/pstore/
F:      include/linux/pstore*
F:      drivers/firmware/efi/efi-pstore.c
F:      drivers/acpi/apei/erst.c

PTP HARDWARE CLOCK SUPPORT
M:      Richard Cochran <richardcochran@gmail.com>
L:      netdev@vger.kernel.org
S:      Maintained
```

```
W:      http://linuxptp.sourceforge.net/
F:      Documentation/ABI/testing/sysfs-ptp
F:      Documentation/ptp/*
F:      drivers/net/ethernet/freescale/gianfar_ptp.c
F:      drivers/net/phy/dp83640*
F:      drivers/ptp/*
F:      include/linux/ptp_cl*

PTRACE SUPPORT
M:      Roland McGrath <roland@redhat.com>
M:      Oleg Nesterov <oleg@redhat.com>
S:      Maintained
F:      include/asm-generic/syscall.h
F:      include/linux/ptrace.h
F:      include/linux/regset.h
F:      include/linux/tracehook.h
F:      include/uapi/linux/ptrace.h
F:      kernel/ptrace.c

PVRUSB2 VIDEO4LINUX DRIVER
M:      Mike Isely <isely@pobox.com>
L:      pvrusb2@isely.net      (subscribers-only)
L:      linux-media@vger.kernel.org
W:      http://www.isely.net/pvrusb2/
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      Documentation/video4linux/README.pvrusb2
F:      drivers/media/usb/pvrusb2/

PWC WEBCAM DRIVER
M:      Hans de Goede <hdegoede@redhat.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/usb/pwc/*

PWM SUBSYSTEM
M:      Thierry Reding <thierry.reding@avionic-design.de>
L:      linux-kernel@vger.kernel.org
S:      Maintained
W:      http://gitorious.org/linux-pwm
T:      git git://gitorious.org/linux-pwm/linux-pwm.git
F:      Documentation/pwm.txt
F:      Documentation/devicetree/bindings/pwm/
F:      include/linux/pwm.h
F:      drivers/pwm/
F:      drivers/video/backlight/pwm_bl.c
F:      include/linux/pwm_backlight.h

PXA2xx/PXA3xx SUPPORT
M:      Eric Miao <eric.y.miao@gmail.com>
M:      Russell King <linux@arm.linux.org.uk>
M:      Haojian Zhuang <haojian.zhuang@gmail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
T:      git git://github.com/hzhuang1/linux.git
T:      git git://git.linaro.org/people/ycmiao/pxa-linux.git
S:      Maintained
```

```
F:      arch/arm/mach-pxa/
F:      drivers/pcmcia/pxa2xx*
F:      drivers/spi/spi-pxa2xx*
F:      drivers/usb/gadget/pxa2*
F:      include/sound/pxa2xx-lib.h
F:      sound/arm/pxa*
F:      sound/soc/pxa

MMP SUPPORT
M:      Eric Miao <eric.y.miao@gmail.com>
M:      Haojian Zhuang <haojian.zhuang@gmail.com>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
T:      git git://github.com/hzhuang1/linux.git
T:      git git://git.linaro.org/people/ycmiao/pxa-linux.git
S:      Maintained
F:      arch/arm/mach-mmp/

PXA MMCI DRIVER
S:      Orphan

PXA RTC DRIVER
M:      Robert Jarzmik <robert.jarzmik@free.fr>
L:      rtc-linux@googlegroups.com
S:      Maintained

QIB DRIVER
M:      Mike Marciniszyn <infinipath@intel.com>
L:      linux-rdma@vger.kernel.org
S:      Supported
F:      drivers/infiniband/hw/qib/

QLOGIC QLA1280 SCSI DRIVER
M:      Michael Reed <mdr@sgi.com>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/qla1280.[ch]

QLOGIC QLA2XXX FC-SCSI DRIVER
M:      Andrew Vasquez <andrew.vasquez@qlogic.com>
M:      linux-driver@qlogic.com
L:      linux-scsi@vger.kernel.org
S:      Supported
F:      Documentation/scsi/LICENSE.qla2xxx
F:      drivers/scsi/qla2xxx/

QLOGIC QLA4XXX iSCSI DRIVER
M:      Ravi Anand <ravi.anand@qlogic.com>
M:      Vikas Chaudhary <vikas.chaudhary@qlogic.com>
M:      iscsi-driver@qlogic.com
L:      linux-scsi@vger.kernel.org
S:      Supported
F:      drivers/scsi/qla4xxx/

QLOGIC QLA3XXX NETWORK DRIVER
M:      Jitendra Kalsaria <jitendra.kalsaria@qlogic.com>
M:      Ron Mercer <ron.mercer@qlogic.com>
M:      linux-driver@qlogic.com
```

```
L:      netdev@vger.kernel.org
S:      Supported
F:      Documentation/networking/LICENSE.qla3xxx
F:      drivers/net/ethernet/qlogic/qla3xxx.*

QLOGIC QLCNIC (1/10)Gb ETHERNET DRIVER
M:      Rajesh Borundia <rajesh.borundia@qlogic.com>
M:      Shahed Shaikh <shahed.shaikh@qlogic.com>
M:      Jitendra Kalsaria <jitendra.kalsaria@qlogic.com>
M:      Sony Chacko <sony.chacko@qlogic.com>
M:      linux-driver@qlogic.com
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/qlogic/qlcnic/

QLOGIC QLGE 10Gb ETHERNET DRIVER
M:      Shahed Shaikh <shahed.shaikh@qlogic.com>
M:      Jitendra Kalsaria <jitendra.kalsaria@qlogic.com>
M:      Ron Mercer <ron.mercer@qlogic.com>
M:      linux-driver@qlogic.com
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/qlogic/qlge/

QNX4 FILESYSTEM
M:      Anders Larsen <al@alarsen.net>
W:      http://www.alarsen.net/linux/qnx4fs/
S:      Maintained
F:      fs/qnx4/
F:      include/uapi/linux/qnx4_fs.h
F:      include/uapi/linux/qnxtypes.h

QT1010 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/tuners/qt1010*

QUALCOMM HEXAGON ARCHITECTURE
M:      Richard Kuo <rkuo@codeaurora.org>
L:      linux-hexagon@vger.kernel.org
S:      Supported
F:      arch/hexagon/

QUICKCAM PARALLEL PORT WEBCAMS
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Odd Fixes
F:      drivers/media/parport/*-qcam*

RADOS BLOCK DEVICE (RBD)
```

```
M:      Yehuda Sadeh <yehuda@inktank.com>
M:      Sage Weil <sage@inktank.com>
M:      Alex Elder <elder@inktank.com>
M:      ceph-devel@vger.kernel.org
W:      http://ceph.com/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/sage/ceph-client.git
S:      Supported
F:      drivers/block/rbd.c
F:      drivers/block/rbd_types.h

RADEON FRAMEBUFFER DISPLAY DRIVER
M:      Benjamin Herrenschmidt <benh@kernel.crashing.org>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/aty/radeon*
F:      include/uapi/linux/radeonfb.h

RADIOSHARK RADIO DRIVER
M:      Hans de Goede <hdegoede@redhat.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/radio/radio-shark.c

RADIOSHARK2 RADIO DRIVER
M:      Hans de Goede <hdegoede@redhat.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/radio/radio-shark2.c
F:      drivers/media/radio/radio-tea5777.c

RAGE128 FRAMEBUFFER DISPLAY DRIVER
M:      Paul Mackerras <paulus@samba.org>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/aty/aty128fb.c

RALINK RT2X00 WIRELESS LAN DRIVER
P:      rt2x00 project
M:      Ivo van Doorn <IvDoorn@gmail.com>
M:      Gertjan van Wingerde <gwingerde@gmail.com>
M:      Helmut Schaa <helmut.schaa@googlemail.com>
L:      linux-wireless@vger.kernel.org
L:      users@rt2x00.serialmonkey.com (moderated for non-subscribers)
W:      http://rt2x00.serialmonkey.com/
S:      Maintained
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/ivd/rt2x00.git
F:      drivers/net/wireless/rt2x00/

RAMDISK RAM BLOCK DEVICE DRIVER
M:      Nick Piggin <npiggin@kernel.dk>
S:      Maintained
F:      Documentation/blockdev/ramdisk.txt
F:      drivers/block/brd.c

RANDOM NUMBER DRIVER
```

```
M:      Theodore Ts'o" <tytso@mit.edu>
S:      Maintained
F:      drivers/char/random.c

RAPIDIO SUBSYSTEM
M:      Matt Porter <mporter@kernel.crashing.org>
M:      Alexandre Bounine <alexandre.bounine@idt.com>
S:      Maintained
F:      drivers/rapidio/

RAYLINK/WEBGEAR 802.11 WIRELESS LAN DRIVER
L:      linux-wireless@vger.kernel.org
S:      Orphan
F:      drivers/net/wireless/ray*

RCUTORTURE MODULE
M:      Josh Triplett <josh@freedesktop.org>
M:      "Paul E. McKenney" <paulmck@linux.vnet.ibm.com>
S:      Supported
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/paulmck/linux-
rcu.git
F:      Documentation/RCU/torture.txt
F:      kernel/rcutorture.c

RDC R-321X SoC
M:      Florian Fainelli <florian@openwrt.org>
S:      Maintained

RDC R6040 FAST ETHERNET DRIVER
M:      Florian Fainelli <florian@openwrt.org>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/rdc/r6040.c

RDS - RELIABLE DATAGRAM SOCKETS
M:      Venkat Venkatsubra <venkat.x.venkatsubra@oracle.com>
L:      rds-devel@oss.oracle.com (moderated for non-subscribers)
S:      Supported
F:      net/rds/

READ-COPY UPDATE (RCU)
M:      Dipankar Sarma <dipankar@in.ibm.com>
M:      "Paul E. McKenney" <paulmck@linux.vnet.ibm.com>
W:      http://www.rdrop.com/users/paulmck/RCU/
S:      Supported
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/paulmck/linux-
rcu.git
F:      Documentation/RCU/
X:      Documentation/RCU/torture.txt
F:      include/linux/rcu*
F:      kernel/rcu*
X:      kernel/rcutorture.c

REAL TIME CLOCK (RTC) SUBSYSTEM
M:      Alessandro Zummo <a.zummo@towertech.it>
L:      rtc-linux@googlegroups.com
Q:      http://patchwork.ozlabs.org/project/rtc-linux/list/
```

```
S:      Maintained
F:      Documentation/rtc.txt
F:      drivers/rtc/
F:      include/linux/rtc.h
F:      include/uapi/linux/rtc.h

REISERFS FILE SYSTEM
L:      reiserfs-devel@vger.kernel.org
S:      Supported
F:      fs/reiserfs/

REGISTER MAP ABSTRACTION
M:      Mark Brown <broonie@kernel.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/broonie/regmap.git
S:      Supported
F:      drivers/base/regmap/
F:      include/linux/regmap.h

REMOTE PROCESSOR (REMOTEPROC) SUBSYSTEM
M:      Ohad Ben-Cohen <ohad@wizery.com>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/ohad/remoteproc.git
S:      Maintained
F:      drivers/remoteproc/
F:      Documentation/remoteproc.txt
F:      include/linux/remoteproc.h

REMOTE PROCESSOR MESSAGING (RPMSG) SUBSYSTEM
M:      Ohad Ben-Cohen <ohad@wizery.com>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/ohad/rpmsg.git
S:      Maintained
F:      drivers/rpmsg/
F:      Documentation/rpmsg.txt
F:      include/linux/rpmsg.h

RFKILL
M:      Johannes Berg <johannes@sipsolutions.net>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jberg/mac80211.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jberg/mac80211-
next.git
S:      Maintained
F:      Documentation/rfkill.txt
F:      net/rfkill/

RICOH SMARTMEDIA/XD DRIVER
M:      Maxim Levitsky <maximlevitsky@gmail.com>
S:      Maintained
F:      drivers/mtd/nand/r852.c
F:      drivers/mtd/nand/r852.h

RICOH R5C592 MEMORYSTICK DRIVER
M:      Maxim Levitsky <maximlevitsky@gmail.com>
S:      Maintained
F:      drivers/memstick/host/r592.*

ROCKETPORT DRIVER
```

```
P:      Comtrol Corp.
W:      http://www.comtrol.com
S:      Maintained
F:      Documentation/serial/rocket.txt
F:      drivers/tty/rocket*

ROSE NETWORK LAYER
M:      Ralf Baechle <ralf@linux-mips.org>
L:      linux-hams@vger.kernel.org
W:      http://www.linux-ax25.org/
S:      Maintained
F:      include/net/rose.h
F:      include/uapi/linux/rose.h
F:      net/rose/

RTL2830 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/dvb-frontends/rtl2830*

RTL2832 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/dvb-frontends/rtl2832*

RTL8180 WIRELESS DRIVER
M:      "John W. Linville" <linville@tuxdriver.com>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/linville/wireless-
testing.git
S:      Maintained
F:      drivers/net/wireless/rtl818x/rtl8180/

RTL8187 WIRELESS DRIVER
M:      Herton Ronaldo Krzesinski <herton@canonical.com>
M:      Hin-Tak Leung <htl10@users.sourceforge.net>
M:      Larry Finger <Larry.Finger@lwfinger.net>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/linville/wireless-
testing.git
S:      Maintained
F:      drivers/net/wireless/rtl818x/rtl8187/

RTL8192CE WIRELESS DRIVER
M:      Larry Finger <Larry.Finger@lwfinger.net>
```

```
M:      Chaoming Li <chaoming_li@realsil.com.cn>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/linville/wireless-
testing.git
S:      Maintained
F:      drivers/net/wireless/rtlwifi/
F:      drivers/net/wireless/rtlwifi/rtl8192ce/

S3 SAVAGE FRAMEBUFFER DRIVER
M:      Antonino Daplas <adaplas@gmail.com>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/savage/

S390
M:      Martin Schwidefsky <schwidefsky@de.ibm.com>
M:      Heiko Carstens <heiko.carstens@de.ibm.com>
M:      linux390@de.ibm.com
L:      linux-s390@vger.kernel.org
W:      http://www.ibm.com/developerworks/linux/linux390/
S:      Supported
F:      arch/s390/
F:      drivers/s390/
F:      block/partitions/ibm.c
F:      Documentation/s390/
F:      Documentation/DocBook/s390*

S390 NETWORK DRIVERS
M:      Ursula Braun <ursula.braun@de.ibm.com>
M:      Frank Blaschka <blaschka@linux.vnet.ibm.com>
M:      linux390@de.ibm.com
L:      linux-s390@vger.kernel.org
W:      http://www.ibm.com/developerworks/linux/linux390/
S:      Supported
F:      drivers/s390/net/

S390 ZCRYPT DRIVER
M:      Ingo Tuchscherer <ingo.tuchscherer@de.ibm.com>
M:      linux390@de.ibm.com
L:      linux-s390@vger.kernel.org
W:      http://www.ibm.com/developerworks/linux/linux390/
S:      Supported
F:      drivers/s390/crypto/

S390 ZFCP DRIVER
M:      Steffen Maier <maier@linux.vnet.ibm.com>
M:      linux390@de.ibm.com
L:      linux-s390@vger.kernel.org
W:      http://www.ibm.com/developerworks/linux/linux390/
S:      Supported
F:      drivers/s390/scsi/zfcp_*

S390 IUCV NETWORK LAYER
M:      Ursula Braun <ursula.braun@de.ibm.com>
M:      linux390@de.ibm.com
L:      linux-s390@vger.kernel.org
```

```
W:      http://www.ibm.com/developerworks/linux/linux390/
S:      Supported
F:      drivers/s390/net/*iucv*
F:      include/net/iucv/
F:      net/iucv/

S3C24XX SD/MMC Driver
M:      Ben Dooks <ben-linux@fluff.org>
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
S:      Supported
F:      drivers/mmc/host/s3cmci.*

SAA6588 RDS RECEIVER DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Odd Fixes
F:      drivers/media/i2c/saa6588*

SAA7134 VIDEO4LINUX DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Odd fixes
F:      Documentation/video4linux/*.saa7134
F:      drivers/media/pci/saa7134/

SAA7146 VIDEO4LINUX-2 DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/common/saa7146/
F:      drivers/media/pci/saa7146/
F:      include/media/saa7146*

SAMSUNG LAPTOP DRIVER
M:      Corentin Chary <corentin.chary@gmail.com>
L:      platform-driver-x86@vger.kernel.org
S:      Maintained
F:      drivers/platform/x86/samsung-laptop.c

SAMSUNG AUDIO (ASoC) DRIVERS
M:      Sangbeom Kim <sbkim73@samsung.com>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
S:      Supported
F:      sound/soc/samsung

SAMSUNG FRAMEBUFFER DRIVER
M:      Jingoo Han <jg1.han@samsung.com>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/s3c-fb.c

SAMSUNG MULTIFUNCTION DEVICE DRIVERS
```

```
M:      Sangbeom Kim <sbkim73@samsung.com>
L:      linux-kernel@vger.kernel.org
S:      Supported
F:      drivers/mfd/sec*.c
F:      drivers/regulator/s2m*.c
F:      drivers/regulator/s5m*.c
F:      drivers/rtc/rtc-sec.c
F:      include/linux/mfd/samsung/

SAMSUNG S3C24XX/S3C64XX SOC SERIES CAMIF DRIVER
M:      Sylwester Nawrocki <sylvester.nawrocki@gmail.com>
L:      linux-media@vger.kernel.org
L:      linux-samsung-soc@vger.kernel.org (moderated for non-subscribers)
S:      Maintained
F:      drivers/media/platform/s3c-camif/
F:      include/media/s3c_camif.h

SAMSUNG S5C73M3 CAMERA DRIVER
M:      Kyungmin Park <kyungmin.park@samsung.com>
M:      Andrzej Hajda <a.hajda@samsung.com>
L:      linux-media@vger.kernel.org
S:      Supported
F:      drivers/media/i2c/s5c73m3/*

SERIAL DRIVERS
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
L:      linux-serial@vger.kernel.org
S:      Maintained
F:      drivers/tty/serial

SYNOPSYS DESIGNWARE DMAC DRIVER
M:      Viresh Kumar <viresh.linux@gmail.com>
S:      Maintained
F:      include/linux/dw_dmac.h
F:      drivers/dma/dw_dmac_regs.h
F:      drivers/dma/dw_dmac.c

SYNOPSYS DESIGNWARE MMC/SD/SDIO DRIVER
M:      Seungwon Jeon <tgih.jun@samsung.com>
M:      Jaehoon Chung <jh80.chung@samsung.com>
L:      linux-mmc@vger.kernel.org
S:      Maintained
F:      include/linux/mmc/dw_mmc.h
F:      drivers/mmc/host/dw_mmc*

TIMEKEEPING, NTP
M:      John Stultz <john.stultz@linaro.org>
M:      Thomas Gleixner <tglx@linutronix.de>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tip/tip.git
timers/core
S:      Supported
F:      include/linux/clocksource.h
F:      include/linux/time.h
F:      include/linux/timex.h
F:      include/uapi/linux/time.h
F:      include/uapi/linux/timex.h
F:      kernel/time/clocksource.c
```

```
F:      kernel/time/time*.c
F:      kernel/time/ntp.c
F:      drivers/clocksource

TLG2300 VIDEO4LINUX-2 DRIVER
M:      Huang Shijie <shijie8@gmail.com>
M:      Hans Verkuil <hverkuil@xs4all.nl>
S:      Odd Fixes
F:      drivers/media/usb/tlg2300

SC1200 WDT DRIVER
M:      Zwane Mwaikambo <zwane@arm.linux.org.uk>
S:      Maintained
F:      drivers/watchdog/sc1200wdt.c

SCHEDULER
M:      Ingo Molnar <mingo@redhat.com>
M:      Peter Zijlstra <peterz@infradead.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tip/tip.git
sched/core
S:      Maintained
F:      kernel/sched/
F:      include/linux/sched.h
F:      include/uapi/linux/sched.h

SCORE ARCHITECTURE
M:      Chen Liqin <liqin.chen@sunplusct.com>
M:      Lennox Wu <lennox.wu@gmail.com>
W:      http://www.sunplusct.com
S:      Supported
F:      arch/score/

SCSI CDROM DRIVER
M:      Jens Axboe <axboe@kernel.dk>
L:      linux-scsi@vger.kernel.org
W:      http://www.kernel.dk
S:      Maintained
F:      drivers/scsi/sr*

SCSI RDMA PROTOCOL (SRP) INITIATOR
M:      David Dillow <dillowda@ornl.gov>
L:      linux-rdma@vger.kernel.org
S:      Supported
W:      http://www.openfabrics.org
Q:      http://patchwork.kernel.org/project/linux-rdma/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/dad/srp-
initiator.git
F:      drivers/infiniband/ulp/srp/
F:      include/scsi/srp.h

SCSI SG DRIVER
M:      Doug Gilbert <dgilbert@interlog.com>
L:      linux-scsi@vger.kernel.org
W:      http://www.torque.net/sg
S:      Maintained
F:      drivers/scsi/sg.c
F:      include/scsi/sg.h
```

```
SCSI SUBSYSTEM
M:      "James E.J. Bottomley" <JBottomley@parallels.com>
L:      linux-scsi@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jejb/scsi-misc-
2.6.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jejb/scsi-rc-fixes-
2.6.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jejb/scsi-pending-
2.6.git
S:      Maintained
F:      drivers/scsi/
F:      include/scsi/

SCSI TAPE DRIVER
M:      Kai Mäkisara <Kai.Makisara@kolumbus.fi>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      Documentation/scsi/st.txt
F:      drivers/scsi/st*

SCTP PROTOCOL
M:      Vlad Yasevich <vyasevich@gmail.com>
M:      Neil Horman <nhorman@tuxdriver.com>
L:      linux-sctp@vger.kernel.org
W:      http://lksctp.sourceforge.net
S:      Maintained
F:      Documentation/networking/sctp.txt
F:      include/linux/sctp.h
F:      include/net/sctp/
F:      net/sctp/

SCx200 CPU SUPPORT
M:      Jim Cromie <jim.cromie@gmail.com>
S:      Odd Fixes
F:      Documentation/i2c/busses/scx200_acb
F:      arch/x86/platform/scx200/
F:      drivers/watchdog/scx200_wdt.c
F:      drivers/i2c/busses/scx200*
F:      drivers/mtd/maps/scx200_docflash.c
F:      include/linux/scx200.h

SCx200 GPIO DRIVER
M:      Jim Cromie <jim.cromie@gmail.com>
S:      Maintained
F:      drivers/char/scx200_gpio.c
F:      include/linux/scx200_gpio.h

SCx200 HRT CLOCKSOURCE DRIVER
M:      Jim Cromie <jim.cromie@gmail.com>
S:      Maintained
F:      drivers/clocksource/scx200_hrt.c

SDRICOH_CS MMC/SD HOST CONTROLLER INTERFACE DRIVER
M:      Sascha Sommer <saschasommer@freenet.de>
L:      sdricohcs-devel@lists.sourceforge.net (subscribers-only)
S:      Maintained
```

```
F:      drivers/mmc/host/sdricoh_cs.c

SECURE DIGITAL HOST CONTROLLER INTERFACE (SDHCI) DRIVER
M:      Chris Ball <cjb@laptop.org>
L:      linux-mmc@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/cjb/mmc.git
S:      Maintained
F:      drivers/mmc/host/sdhci.*
F:      drivers/mmc/host/sdhci-pltfm.[ch]

SECURE DIGITAL HOST CONTROLLER INTERFACE, OPEN FIRMWARE BINDINGS (SDHCI-OF)
M:      Anton Vorontsov <avorontsov@ru.mvista.com>
L:      linuxppc-dev@lists.ozlabs.org
L:      linux-mmc@vger.kernel.org
S:      Maintained
F:      drivers/mmc/host/sdhci-pltfm.[ch]

SECURE DIGITAL HOST CONTROLLER INTERFACE (SDHCI) SAMSUNG DRIVER
M:      Ben Dooks <ben-linux@fluff.org>
L:      linux-mmc@vger.kernel.org
S:      Maintained
F:      drivers/mmc/host/sdhci-s3c.c

SECURE DIGITAL HOST CONTROLLER INTERFACE (SDHCI) ST SPEAR DRIVER
M:      Viresh Kumar <viresh.linux@gmail.com>
L:      spear-devel@list.st.com
L:      linux-mmc@vger.kernel.org
S:      Maintained
F:      drivers/mmc/host/sdhci-spear.c

SECURITY SUBSYSTEM
M:      James Morris <james.l.morris@oracle.com>
L:      linux-security-module@vger.kernel.org (suggested Cc:)
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jmorris/linux-
security.git
W:      http://kernsec.org/
S:      Supported
F:      security/

SECURITY CONTACT
M:      Security Officers <security@kernel.org>
S:      Supported

SELINUX SECURITY MODULE
M:      Stephen Smalley <sds@tycho.nsa.gov>
M:      James Morris <james.l.morris@oracle.com>
M:      Eric Paris <eparis@parisplace.org>
L:      selinux@tycho.nsa.gov (subscribers-only, general discussion)
W:      http://selinuxproject.org
T:      git git://git.infradead.org/users/eparis/selinux.git
S:      Supported
F:      include/linux/selinux*
F:      security/selinux/
F:      scripts/selinux/

APPARMOR SECURITY MODULE
M:      John Johansen <john.johansen@canonical.com>
```

```
L:      apparmor@lists.ubuntu.com (subscribers-only, general discussion)
W:      apparmor.wiki.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jj/apparmor-dev.git
S:      Supported
F:      security/apparmor/

SENSABLE PHANTOM
M:      Jiri Slaby <jirislaby@gmail.com>
S:      Maintained
F:      drivers/misc/phantom.c
F:      include/uapi/linux/phantom.h

SERIAL ATA (SATA) SUBSYSTEM
M:      Tejun Heo <tj@kernel.org>
L:      linux-ide@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tj/libata.git
S:      Supported
F:      drivers/ata/
F:      include/linux/ata.h
F:      include/linux/libata.h

SERVER ENGINES 10Gbps iSCSI - BladeEngine 2 DRIVER
M:      Jayamohan Kallickal <jayamohan.kallickal@emulex.com>
L:      linux-scsi@vger.kernel.org
W:      http://www.emulex.com
S:      Supported
F:      drivers/scsi/be2iscsi/

SERVER ENGINES 10Gbps NIC - BladeEngine 2 DRIVER
M:      Sathya Perla <sathya.perla@emulex.com>
M:      Subbu Seetharaman <subbu.seetharaman@emulex.com>
M:      Ajit Khaparde <ajit.khaparde@emulex.com>
L:      netdev@vger.kernel.org
W:      http://www.emulex.com
S:      Supported
F:      drivers/net/ethernet/emulex/benet/

SFC NETWORK DRIVER
M:      Solarflare linux maintainers <linux-net-drivers@solarflare.com>
M:      Ben Hutchings <bhutchings@solarflare.com>
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/sfc/

SGI GRU DRIVER
M:      Dimitri Sivanich <sivanich@sgi.com>
M:      Robin Holt <holt@sgi.com>
S:      Maintained
F:      drivers/misc/sgi-gru/

SGI SN-IA64 (Altix) SERIAL CONSOLE DRIVER
M:      Pat Gefre <pfg@sgi.com>
L:      linux-ia64@vger.kernel.org
S:      Supported
F:      Documentation/ia64/serial.txt
F:      drivers/tty/serial/ioc?_serial.c
F:      include/linux/ioc?.h
```

```
SGI VISUAL WORKSTATION 320 AND 540
M:      Andrey Panin <pazke@donpac.ru>
L:      linux-visws-devel@lists.sf.net
W:      http://linux-visws.sf.net
S:      Maintained for 2.6.
F:      Documentation/sgi-visws.txt

SGI XP/XPC/XPNET DRIVER
M:      Robin Holt <holt@sgi.com>
S:      Maintained
F:      drivers/misc/sgi-xp/

SI470X FM RADIO RECEIVER I2C DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Odd Fixes
F:      drivers/media/radio/si470x/radio-si470x-i2c.c

SI470X FM RADIO RECEIVER USB DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/radio/si470x/radio-si470x-common.c
F:      drivers/media/radio/si470x/radio-si470x.h
F:      drivers/media/radio/si470x/radio-si470x-usb.c

SI4713 FM RADIO TRANSMITTER I2C DRIVER
M:      Eduardo Valentin <edubezval@gmail.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Odd Fixes
F:      drivers/media/radio/si4713-i2c.?

SI4713 FM RADIO TRANSMITTER PLATFORM DRIVER
M:      Eduardo Valentin <edubezval@gmail.com>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Odd Fixes
F:      drivers/media/radio/radio-si4713.h

SIANO DVB DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Odd fixes
F:      drivers/media/common/siano/
F:      drivers/media/dvb/siano/
F:      drivers/media/usb/siano/
F:      drivers/media/mmc/siano
```

```
SH_VEU V4L2 MEM2MEM DRIVER
M:      Guennadi Liakhovetski <g.liakhovetski@gmx.de>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/platform/sh_veu.c

SH_VOU V4L2 OUTPUT DRIVER
M:      Guennadi Liakhovetski <g.liakhovetski@gmx.de>
L:      linux-media@vger.kernel.org
S:      Odd Fixes
F:      drivers/media/platform/sh_vou.c
F:      include/media/sh_vou.h

SIMPLE FIRMWARE INTERFACE (SFI)
M:      Len Brown <lenb@kernel.org>
L:      sfi-devel@simplefirmware.org
W:      http://simplefirmware.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/lenb/linux-sfi-
2.6.git
S:      Supported
F:      arch/x86/platform/sfi/
F:      drivers/sfi/
F:      include/linux/sfi*.h

SIMTEC EB110ATX (Chalice CATS)
P:      Ben Dooks
P:      Vincent Sanders <vince@simtec.co.uk>
M:      Simtec Linux Team <linux@simtec.co.uk>
W:      http://www.simtec.co.uk/products/EB110ATX/
S:      Supported

SIMTEC EB2410ITX (BAST)
P:      Ben Dooks
P:      Vincent Sanders <vince@simtec.co.uk>
M:      Simtec Linux Team <linux@simtec.co.uk>
W:      http://www.simtec.co.uk/products/EB2410ITX/
S:      Supported
F:      arch/arm/mach-s3c2410/mach-bast.c
F:      arch/arm/mach-s3c2410/bast-ide.c
F:      arch/arm/mach-s3c2410/bast-irq.c

TI DAVINCI MACHINE SUPPORT
M:      Sekhar Nori <nsekhar@ti.com>
M:      Kevin Hilman <khilman@deeprootsystems.com>
L:      davinci-linux-open-source@linux.davincidsp.com (moderated for non-
subscribers)
T:      git git://gitorious.org/linux-davinci/linux-davinci.git
Q:      http://patchwork.kernel.org/project/linux-davinci/list/
S:      Supported
F:      arch/arm/mach-davinci
F:      drivers/i2c/busses/i2c-davinci.c

TI DAVINCI SERIES MEDIA DRIVER
M:      Lad, Prabhakar <prabhakar.csengg@gmail.com>
L:      linux-media@vger.kernel.org
```

```
L:      davinci-linux-open-source@linux.davincidsp.com (moderated for non-
subscribers)
W:      http://linuxtv.org/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/mhadli/v4l-dvb-davinci_devices.git
S:      Maintained
F:      drivers/media/platform/davinci/
F:      include/media/davinci/

SIS 190 ETHERNET DRIVER
M:      Francois Romieu <romieu@fr.zoreil.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/sis/sis190.c

SIS 900/7016 FAST ETHERNET DRIVER
M:      Daniele Venzano <venza@brownhat.org>
W:      http://www.brownhat.org/sis900.html
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/sis/sis900.*

SIS FRAMEBUFFER DRIVER
M:      Thomas Winischhofer <thomas@winischhofer.net>
W:      http://www.winischhofer.net/linuxsisvga.shtml
S:      Maintained
F:      Documentation/fb/sisfb.txt
F:      drivers/video/sis/
F:      include/video/sisfb.h

SIS USB2VGA DRIVER
M:      Thomas Winischhofer <thomas@winischhofer.net>
W:      http://www.winischhofer.at/linuxsisusbvga.shtml
S:      Maintained
F:      drivers/usb/misc/sisusbvga/

SLAB ALLOCATOR
M:      Christoph Lameter <cl@linux-foundation.org>
M:      Pekka Enberg <penberg@kernel.org>
M:      Matt Mackall <mpm@selenic.com>
L:      linux-mm@kvack.org
S:      Maintained
F:      include/linux/sl?b*.h
F:      mm/sl?b.c

SLEEPABLE READ-COPY UPDATE (SRCU)
M:      Lai Jiangshan <laijs@cn.fujitsu.com>
M:      "Paul E. McKenney" <paulmck@linux.vnet.ibm.com>
W:      http://www.rdrop.com/users/paulmck/RCU/
S:      Supported
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/paulmck/linux-
rcu.git
F:      include/linux/srcu*
F:      kernel/srcu*

SMACK SECURITY MODULE
M:      Casey Schaufler <casey@schaufler-ca.com>
```

```
L:      linux-security-module@vger.kernel.org
W:      http://schaufler-ca.com
T:      git git://git.gitorious.org/smack-next/kernel.git
S:      Maintained
F:      Documentation/security/Smack.txt
F:      security/smack/

SMC91x ETHERNET DRIVER
M:      Nicolas Pitre <nico@fluxnic.net>
S:      Odd Fixes
F:      drivers/net/ethernet/smsc/smc91x.*

SMIA AND SMIA++ IMAGE SENSOR DRIVER
M:      Sakari Ailus <sakari.ailus@iki.fi>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/i2c/smiapp
F:      include/media/smiapp.h
F:      drivers/media/i2c/smiapp-pll.c
F:      drivers/media/i2c/smiapp-pll.h

SMM665 HARDWARE MONITOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/smm665
F:      drivers/hwmon/smm665.c

SMSC EMC2103 HARDWARE MONITOR DRIVER
M:      Steve Glendinning <steve.glendinning@shawell.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/emc2103
F:      drivers/hwmon/emc2103.c

SMSC SCH5627 HARDWARE MONITOR DRIVER
M:      Hans de Goede <hdegoede@redhat.com>
L:      lm-sensors@lm-sensors.org
S:      Supported
F:      Documentation/hwmon/sch5627
F:      drivers/hwmon/sch5627.c

SMSC47B397 HARDWARE MONITOR DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/smsc47b397
F:      drivers/hwmon/smsc47b397.c

SMSC911x ETHERNET DRIVER
M:      Steve Glendinning <steve.glendinning@shawell.net>
L:      netdev@vger.kernel.org
S:      Maintained
F:      include/linux/smsc911x.h
F:      drivers/net/ethernet/smsc/smsc911x.*

SMSC9420 PCI ETHERNET DRIVER
```

```
M:      Steve Glendinning <steve.glendinning@shawell.net>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/smsc/smsc9420.*

SMSC UFX6000 and UFX7000 USB to VGA DRIVER
M:      Steve Glendinning <steve.glendinning@shawell.net>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      drivers/video/smscufx.c

SOC-CAMERA V4L2 SUBSYSTEM
M:      Guennadi Liakhovetski <g.liakhovetski@gmx.de>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      include/media/soc*
F:      drivers/media/i2c/soc_camera/
F:      drivers/media/platform/soc_camera/

SOEKRIS NET48XX LED SUPPORT
M:      Chris Boot <bootc@bootc.net>
S:      Maintained
F:      drivers/leds/leds-net48xx.c

SOFTWARE RAID (Multiple Disks) SUPPORT
M:      Neil Brown <neilb@suse.de>
L:      linux-raid@vger.kernel.org
S:      Supported
F:      drivers/md/
F:      include/linux/raid/
F:      include/uapi/linux/raid/

SONIC NETWORK DRIVER
M:      Thomas Bogendoerfer <tsbogend@alpha.franken.de>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/natsemi/sonic.*

SONICS SILICON BACKPLANE DRIVER (SSB)
M:      Michael Buesch <m@bues.ch>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/ssb/
F:      include/linux/ssb/

SONY VAIO CONTROL DEVICE DRIVER
M:      Mattia Dongili <malattia@linux.it>
L:      platform-driver-x86@vger.kernel.org
W:      http://www.linux.it/~malattia/wiki/index.php/Sony_drivers
S:      Maintained
F:      Documentation/laptops/sony-laptop.txt
F:      drivers/char/sonypi.c
F:      drivers/platform/x86/sony-laptop.c
F:      include/linux/sony-laptop.h

SONY MEMORYSTICK CARD SUPPORT
```

```
M:      Alex Dubov <oakad@yahoo.com>
W:      http://tifmxx.berlios.de/
S:      Maintained
F:      drivers/memstick/host/tifm_ms.c

SOUND
M:      Jaroslav Kysela <perex@perex.cz>
M:      Takashi Iwai <tiwai@suse.de>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
W:      http://www.alsa-project.org/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tiwai/sound.git
T:      git git://git.alsa-project.org/alsa-kernel.git
S:      Maintained
F:      Documentation/sound/
F:      include/sound/
F:      include/uapi/sound/
F:      sound/

SOUND - SOC LAYER / DYNAMIC AUDIO POWER MANAGEMENT (ASoC)
M:      Liam Girdwood <lgirdwood@gmail.com>
M:      Mark Brown <broonie@kernel.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/broonie/sound.git
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
W:      http://alsa-project.org/main/index.php/ASoC
S:      Supported
F:      sound/soc/
F:      include/sound/soc*

SPARC + UltraSPARC (sparc/sparc64)
M:      "David S. Miller" <davem@davemloft.net>
L:      sparclinux@vger.kernel.org
Q:      http://patchwork.ozlabs.org/project/sparclinux/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/sparc.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/sparc-next.git
S:      Maintained
F:      arch/sparc/
F:      drivers/sbus/

SPARC SERIAL DRIVERS
M:      "David S. Miller" <davem@davemloft.net>
L:      sparclinux@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/sparc.git
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/davem/sparc-next.git
S:      Maintained
F:      include/linux/sunserialcore.h
F:      drivers/tty/serial/suncore.c
F:      drivers/tty/serial/sunhv.c
F:      drivers/tty/serial/sunsab.c
F:      drivers/tty/serial/sunsab.h
F:      drivers/tty/serial/sunsu.c
F:      drivers/tty/serial/sunzilog.c
F:      drivers/tty/serial/sunzilog.h

SPARSE CHECKER
M:      "Christopher Li" <sparse@chrisli.org>
L:      linux-sparse@vger.kernel.org
W:      https://sparse.wiki.kernel.org/
```

```
T:      git git://git.kernel.org/pub/scm/devel/sparse/sparse.git
T:      git git://git.kernel.org/pub/scm/devel/sparse/chrisl/sparse.git
S:      Maintained
F:      include/linux/compiler.h

SPEAR PLATFORM SUPPORT
M:      Viresh Kumar <viresh.linux@gmail.com>
M:      Shiraz Hashim <shiraz.hashim@st.com>
L:      spear-devel@list.st.com
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.st.com/spear
S:      Maintained
F:      arch/arm/plat-spear/

SPEAR13XX MACHINE SUPPORT
M:      Viresh Kumar <viresh.linux@gmail.com>
M:      Shiraz Hashim <shiraz.hashim@st.com>
L:      spear-devel@list.st.com
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.st.com/spear
S:      Maintained
F:      arch/arm/mach-spear13xx/

SPEAR3XX MACHINE SUPPORT
M:      Viresh Kumar <viresh.linux@gmail.com>
M:      Shiraz Hashim <shiraz.hashim@st.com>
L:      spear-devel@list.st.com
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.st.com/spear
S:      Maintained
F:      arch/arm/mach-spear3xx/

SPEAR6XX MACHINE SUPPORT
M:      Rajeev Kumar <rajeev-dlh.kumar@st.com>
M:      Shiraz Hashim <shiraz.hashim@st.com>
M:      Viresh Kumar <viresh.linux@gmail.com>
L:      spear-devel@list.st.com
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.st.com/spear
S:      Maintained
F:      arch/arm/mach-spear6xx/

SPEAR CLOCK FRAMEWORK SUPPORT
M:      Viresh Kumar <viresh.linux@gmail.com>
L:      spear-devel@list.st.com
L:      linux-arm-kernel@lists.infradead.org (moderated for non-subscribers)
W:      http://www.st.com/spear
S:      Maintained
F:      drivers/clk/spear/

SPI SUBSYSTEM
M:      Mark Brown <broonie@kernel.org>
M:      Grant Likely <grant.likely@linaro.org>
L:      linux-spi@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/broonie/spi.git
Q:      http://patchwork.kernel.org/project/spi-devel-general/list/
S:      Maintained
```

```
F:      Documentation/spi/
F:      drivers/spi/
F:      include/linux/spi/
F:      include/uapi/linux/spi/

SPIDERNET NETWORK DRIVER for CELL
M:      Ishizaki Kou <kou.ishizaki@toshiba.co.jp>
M:      Jens Osterkamp <jens@de.ibm.com>
L:      netdev@vger.kernel.org
S:      Supported
F:      Documentation/networking/spider_net.txt
F:      drivers/net/ethernet/toshiba/spider_net*

SPU FILE SYSTEM
M:      Jeremy Kerr <jk@ozlabs.org>
L:      linuxppc-dev@lists.ozlabs.org
L:      cbe-oss-dev@lists.ozlabs.org
W:      http://www.ibm.com/developerworks/power/cell/
S:      Supported
F:      Documentation/filesystems/spufs.txt
F:      arch/powerpc/platforms/cell/spufs/

SQUASHFS FILE SYSTEM
M:      Phillip Lougher <phillip@squashfs.org.uk>
L:      squashfs-devel@lists.sourceforge.net (subscribers-only)
W:      http://squashfs.org.uk
S:      Maintained
F:      Documentation/filesystems/squashfs.txt
F:      fs/squashfs/

SRM (Alpha) environment access
M:      Jan-Benedict Glaw <jbglaw@lug-owl.de>
S:      Maintained
F:      arch/alpha/kernel/srm_env.c

STABLE BRANCH
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
L:      stable@vger.kernel.org
S:      Supported

STAGING SUBSYSTEM
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/gregkh/staging.git
L:      devel@driverdev.osuosl.org
S:      Supported
F:      drivers/staging/

STAGING - AGERE HERMES II and II.5 WIRELESS DRIVERS
M:      Henk de Groot <pe1dnn@amsat.org>
S:      Odd Fixes
F:      drivers/staging/wlags49_h2/
F:      drivers/staging/wlags49_h25/

STAGING - ASUS OLED
M:      Jakub Schmidtke <sjakub@gmail.com>
S:      Odd Fixes
F:      drivers/staging/asus_oled/
```

```
STAGING - COMEDI
M:      Ian Abbott <abbotti@mev.co.uk>
M:      Mori Hess <fmhess@users.sourceforge.net>
S:      Odd Fixes
F:      drivers/staging/comedi/

STAGING - CRYSTAL HD VIDEO DECODER
M:      Naren Sankar <nsankar@broadcom.com>
M:      Jarod Wilson <jarod@wilsonet.com>
M:      Scott Davilla <davilla@4pi.com>
M:      Manu Abraham <abraham.manu@gmail.com>
S:      Odd Fixes
F:      drivers/staging/crystalhd/

STAGING - ECHO CANCELLER
M:      Steve Underwood <steveu@coppice.org>
M:      David Rowe <david@rowetel.com>
S:      Odd Fixes
F:      drivers/staging/echo/

STAGING - ET131X NETWORK DRIVER
M:      Mark Einon <mark.einon@gmail.com>
S:      Odd Fixes
F:      drivers/staging/et131x/

STAGING - FLARION FT1000 DRIVERS
M:      Marek Belisko <marek.belisko@gmail.com>
S:      Odd Fixes
F:      drivers/staging/ft1000/

STAGING - FRONTIER TRANZPORT AND ALPHATRACK
M:      David Täht <d@teklibre.com>
S:      Odd Fixes
F:      drivers/staging/frontier/

STAGING - GO7007 MPEG CODEC
M:      Hans Verkuil <hans.verkuil@cisco.com>
S:      Maintained
F:      drivers/staging/media/go7007/

STAGING - INDUSTRIAL IO
M:      Jonathan Cameron <jic23@cam.ac.uk>
L:      linux-iio@vger.kernel.org
S:      Odd Fixes
F:      drivers/staging/iio/

STAGING - LIRC (LINUX INFRARED REMOTE CONTROL) DRIVERS
M:      Jarod Wilson <jarod@wilsonet.com>
W:      http://www.lirc.org/
S:      Odd Fixes
F:      drivers/staging/media/lirc/

STAGING - NVIDIA COMPLIANT EMBEDDED CONTROLLER INTERFACE (nvec)
M:      Julian Andres Klode <jak@jak-linux.org>
M:      Marc Dietrich <marvin24@gmx.de>
L:      ac100@lists.launchpad.net (moderated for non-subscribers)
```

```
L:      linux-tegra@vger.kernel.org
S:      Maintained
F:      drivers/staging/nvec/

STAGING - OLPC SECONDARY DISPLAY CONTROLLER (DCON)
M:      Andres Salomon <dilinger@queued.net>
M:      Chris Ball <cjb@laptop.org>
M:      Jon Nettleton <jon.nettleton@gmail.com>
W:      http://wiki.laptop.org/go/DCON
S:      Odd Fixes
F:      drivers/staging/olpc_dcon/

STAGING - OZMO DEVICES USB OVER WIFI DRIVER
M:      Rupesh Gujare <rupesh.gujare@atmel.com>
S:      Maintained
F:      drivers/staging/ozwpan/

STAGING - PARALLEL LCD/KEYPAD PANEL DRIVER
M:      Willy Tarreau <willy@meta-x.org>
S:      Odd Fixes
F:      drivers/staging/panel/

STAGING - REALTEK RTL8712U DRIVERS
M:      Larry Finger <Larry.Finger@lwfinger.net>
M:      Florian Schilhabel <florian.c.schilhabel@googlemail.com>.
S:      Odd Fixes
F:      drivers/staging/rtl8712/

STAGING - SILICON MOTION SM7XX FRAME BUFFER DRIVER
M:      Teddy Wang <teddy.wang@siliconmotion.com.cn>
S:      Odd Fixes
F:      drivers/staging/sm7xxfb/

STAGING - SOFTLOGIC 6x10 MPEG CODEC
M:      Ismael Luceno <ismael.luceno@corp.bluecherry.net>
S:      Supported
F:      drivers/staging/media/solo6x10/

STAGING - SPEAKUP CONSOLE SPEECH DRIVER
M:      William Hubbs <w.d.hubbs@gmail.com>
M:      Chris Brannon <chris@the-brannons.com>
M:      Kirk Reiser <kirk@braille.uwo.ca>
M:      Samuel Thibault <samuel.thibault@ens-lyon.org>
L:      speakup@braille.uwo.ca
W:      http://www.linux-speakup.org/
S:      Odd Fixes
F:      drivers/staging/speakup/

STAGING - TI DSP BRIDGE DRIVERS
M:      Omar Ramirez Luna <omar.ramirez@copitl.com>
S:      Odd Fixes
F:      drivers/staging/tidspbridge/

STAGING - USB ENE SM/MS CARD READER DRIVER
M:      Al Cho <acho@novell.com>
S:      Odd Fixes
F:      drivers/staging/keucr/
```

```
STAGING - VIA VT665X DRIVERS
M:      Forest Bond <forest@alittletooquiet.net>
S:      Odd Fixes
F:      drivers/staging/vt665?/

STAGING - WINBOND IS89C35 WLAN USB DRIVER
M:      Pavel Machek <pavel@ucw.cz>
S:      Odd Fixes
F:      drivers/staging/winbond/

STAGING - XGI Z7,Z9,Z11 PCI DISPLAY DRIVER
M:      Arnaud Patard <arnaud.patard@rtp-net.org>
S:      Odd Fixes
F:      drivers/staging/xgifb/

STARFIRE/DURALAN NETWORK DRIVER
M:      Ion Badulescu <ionut@badula.org>
S:      Odd Fixes
F:      drivers/net/ethernet/adaptec/starfire*

SUN3/3X
M:      Sam Creasey <sammy@sammy.net>
W:      http://sammy.net/sun3/
S:      Maintained
F:      arch/m68k/kernel/*sun3*
F:      arch/m68k/sun3*/
F:      arch/m68k/include/asm/sun3*
F:      drivers/net/ethernet/i825xx/sun3*

SUPERH
M:      Paul Mundt <lethal@linux-sh.org>
L:      linux-sh@vger.kernel.org
W:      http://www.linux-sh.org
Q:      http://patchwork.kernel.org/project/linux-sh/list/
T:      git git://github.com/pmundt/linux-sh.git sh-latest
S:      Supported
F:      Documentation/sh/
F:      arch/sh/
F:      drivers/sh/

SUSPEND TO RAM
M:      Len Brown <len.brown@intel.com>
M:      Pavel Machek <pavel@ucw.cz>
M:      "Rafael J. Wysocki" <rjw@sisk.pl>
L:      linux-pm@vger.kernel.org
S:      Supported
F:      Documentation/power/
F:      arch/x86/kernel/acpi/
F:      drivers/base/power/
F:      kernel/power/
F:      include/linux/suspend.h
F:      include/linux/freezer.h
F:      include/linux/pm.h

SVGA HANDLING
M:      Martin Mares <mj@ucw.cz>
```

```
L:      linux-video@atrey.karlin.mff.cuni.cz
S:      Maintained
F:      Documentation/svga.txt
F:      arch/x86/boot/video*

SWIOTLB SUBSYSTEM
M:      Konrad Rzeszutek Wilk <konrad.wilk@oracle.com>
L:      linux-kernel@vger.kernel.org
S:      Supported
F:      lib/swiotlb.c
F:      arch/*/kernel/pci-swiotlb.c
F:      include/linux/swiotlb.h

SYNOPSYS ARC ARCHITECTURE
M:      Vineet Gupta <vgupta@synopsys.com>
S:      Supported
F:      arch/arc/
F:      Documentation/devicetree/bindings/arc/
F:      drivers/tty/serial/arc-uart.c

SYSV FILESYSTEM
M:      Christoph Hellwig <hch@infradead.org>
S:      Maintained
F:      Documentation/filesystems/sysv-fs.txt
F:      fs/sysv/
F:      include/linux/sysv_fs.h

TARGET SUBSYSTEM
M:      Nicholas A. Bellinger <nab@linux-iscsi.org>
L:      linux-scsi@vger.kernel.org
L:      target-devel@vger.kernel.org
L:      http://groups.google.com/group/linux-iscsi-target-dev
W:      http://www.linux-iscsi.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/nab/target-
pending.git master
S:      Supported
F:      drivers/target/
F:      include/target/
F:      Documentation/target/

TASKSTATS STATISTICS INTERFACE
M:      Balbir Singh <bsingharora@gmail.com>
S:      Maintained
F:      Documentation/accounting/taskstats*
F:      include/linux/taskstats*
F:      kernel/taskstats.c

TC CLASSIFIER
M:      Jamal Hadi Salim <jhs@mojatatu.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      include/net/pkt_cls.h
F:      include/uapi/linux/pkt_cls.h
F:      net/sched/

TCP LOW PRIORITY MODULE
M:      "Wong Hoi Sing, Edison" <hswong3i@gmail.com>
```

```
M:      "Hung Hing Lun, Mike" <hlhung3i@gmail.com>
W:      http://tcp-lp-mod.sourceforge.net/
S:      Maintained
F:      net/ipv4/tcp_lp.c

TDA10071 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/dvb-frontends/tda10071*

TDA18212 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/tuners/tda18212*

TDA18218 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/tuners/tda18218*

TDA18271 MEDIA DRIVER
M:      Michael Krufky <mkrufky@linuxtv.org>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://github.com/mkrufky
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/mkrufky/tuners.git
S:      Maintained
F:      drivers/media/tuners/tda18271*

TDA827x MEDIA DRIVER
M:      Michael Krufky <mkrufky@linuxtv.org>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://github.com/mkrufky
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/mkrufky/tuners.git
S:      Maintained
F:      drivers/media/tuners/tda8290.*

TDA8290 MEDIA DRIVER
M:      Michael Krufky <mkrufky@linuxtv.org>
```

```
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://github.com/mkrufky
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/mkrufky/tuners.git
S:      Maintained
F:      drivers/media/tuners/tda8290.*

TDA9840 MEDIA DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/i2c/tda9840*

TEA5761 TUNER DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Odd fixes
F:      drivers/media/tuners/tea5761.*

TEA5767 TUNER DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/tuners/tea5767.*

TEA6415C MEDIA DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/i2c/tea6415c*

TEA6420 MEDIA DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/i2c/tea6420*

TEAM DRIVER
M:      Jiri Pirko <jiri@resnulli.us>
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/team/
F:      include/linux/if_team.h
F:      include/uapi/linux/if_team.h

TECHNOLOGIC SYSTEMS TS-5500 PLATFORM SUPPORT
```

```
M:      Savoir-faire Linux Inc. <kernel@savoirfairelinux.com>
S:      Maintained
F:      arch/x86/platform/ts5500/

TECHNOTREND USB IR RECEIVER
M:      Sean Young <sean@mess.org>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/rc/ttusbir.c

TEGRA SUPPORT
M:      Stephen Warren <swarren@wwwdotorg.org>
L:      linux-tegra@vger.kernel.org
Q:      http://patchwork.ozlabs.org/project/linux-tegra/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/swarren/linux-
tegra.git
S:      Supported
N:      [^a-z]tegra

TEHUTI ETHERNET DRIVER
M:      Andy Gospodarek <andy@greyhouse.net>
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/ethernet/tehuti/*

Telecom Clock Driver for MCPL0010
M:      Mark Gross <mark.gross@intel.com>
S:      Supported
F:      drivers/char/tlclk.c

TENSILICA XTENSA PORT (xtensa)
M:      Chris Zankel <chris@zankel.net>
M:      Max Filippov <jcmvbkbc@gmail.com>
L:      linux-xtensa@linux-xtensa.org
S:      Maintained
F:      arch/xtensa/

THERMAL
M:      Zhang Rui <rui.zhang@intel.com>
M:      Eduardo Valentin <eduardo.valentin@ti.com>
L:      linux-pm@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/rzhang/linux.git
Q:      https://patchwork.kernel.org/project/linux-pm/list/
S:      Supported
F:      drivers/thermal/
F:      include/linux/thermal.h
F:      include/linux/cpu_cooling.h

THINGM BLINK(1) USB RGB LED DRIVER
M:      Vivien Didelot <vivien.didelot@savoirfairelinux.com>
S:      Maintained
F:      drivers/hid/hid-thingm.c

THINKPAD ACPI EXTRAS DRIVER
M:      Henrique de Moraes Holschuh <ibm-acpi@hmh.eng.br>
L:      ibm-acpi-devel@lists.sourceforge.net
L:      platform-driver-x86@vger.kernel.org
```

```
W:      http://ibm-acpi.sourceforge.net
W:      http://thinkwiki.org/wiki/Ibm-acpi
T:      git git://repo.or.cz/linux-2.6/linux-acpi-2.6/ibm-acpi-2.6.git
S:      Maintained
F:      drivers/platform/x86/thinkpad_acpi.c

TI BANDGAP AND THERMAL DRIVER
M:      Eduardo Valentin <eduardo.valentin@ti.com>
L:      linux-pm@vger.kernel.org
S:      Maintained
F:      drivers/staging/omap-thermal/

TI FLASH MEDIA INTERFACE DRIVER
M:      Alex Dubov <oakad@yahoo.com>
S:      Maintained
F:      drivers/misc/tifm*
F:      drivers/mmc/host/tifm_sd.c
F:      include/linux/tifm.h

TI LM49xxx FAMILY ASoC CODEC DRIVERS
M:      M R Swami Reddy <mr.swami.reddy@ti.com>
M:      Vishwas A Deshpande <vishwas.a.deshpande@ti.com>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
S:      Maintained
F:      sound/soc/codecs/lm49453*
F:      sound/soc/codecs/isabelle*

TI LP855x BACKLIGHT DRIVER
M:      Milo Kim <milo.kim@ti.com>
S:      Maintained
F:      Documentation/backlight/lp855x-driver.txt
F:      drivers/video/backlight/lp855x_bl.c
F:      include/linux/platform_data/lp855x.h

TI LP8727 CHARGER DRIVER
M:      Milo Kim <milo.kim@ti.com>
S:      Maintained
F:      drivers/power/lp8727_charger.c
F:      include/linux/platform_data/lp8727.h

TI LP8788 MFD DRIVER
M:      Milo Kim <milo.kim@ti.com>
S:      Maintained
F:      drivers/iio/adc/lp8788_adc.c
F:      drivers/leds/leds-lp8788.c
F:      drivers/mfd/lp8788*.c
F:      drivers/power/lp8788-charger.c
F:      drivers/regulator/lp8788-*.c
F:      include/linux/mfd/lp8788*.h

TI TWL4030 SERIES SOC CODEC DRIVER
M:      Peter Ujfalusi <peter.ujfalusi@ti.com>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
S:      Maintained
F:      sound/soc/codecs/twl4030*

TI WILINK WIRELESS DRIVERS
```

```
M:      Luciano Coelho <coelho@ti.com>
L:      linux-wireless@vger.kernel.org
W:      http://wireless.kernel.org/en/users/Drivers/wl12xx
W:      http://wireless.kernel.org/en/users/Drivers/wl1251
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/luca/wl12xx.git
S:      Maintained
F:      drivers/net/wireless/ti/
F:      include/linux/wl12xx.h

TIPC NETWORK LAYER
M:      Jon Maloy <jon.maloy@ericsson.com>
M:      Allan Stephens <allan.stephens@windriver.com>
L:      netdev@vger.kernel.org (core kernel code)
L:      tipc-discussion@lists.sourceforge.net (user apps, general discussion)
W:      http://tipc.sourceforge.net/
S:      Maintained
F:      include/uapi/linux/tipc*.h
F:      net/tipc/

TILE ARCHITECTURE
M:      Chris Metcalf <cmetcalf@tilera.com>
W:      http://www.tilera.com/scm/
S:      Supported
F:      arch/tile/
F:      drivers/tty/hvc/hvc_tile.c
F:      drivers/net/ethernet/tile/
F:      drivers/edac/tile_edac.c

TLAN NETWORK DRIVER
M:      Samuel Chessman <chessman@tux.org>
L:      tlan-devel@lists.sourceforge.net (subscribers-only)
W:      http://sourceforge.net/projects/tlan/
S:      Maintained
F:      Documentation/networking/tlan.txt
F:      drivers/net/ethernet/ti/tlan.*

TOMOYO SECURITY MODULE
M:      Kentaro Takeda <takedakn@nttdata.co.jp>
M:      Tetsuo Handa <penguin-kernel@I-love.SAKURA.ne.jp>
L:      tomoyo-dev-en@lists.sourceforge.jp (subscribers-only, for developers
in English)
L:      tomoyo-users-en@lists.sourceforge.jp (subscribers-only, for users in
English)
L:      tomoyo-dev@lists.sourceforge.jp (subscribers-only, for developers in
Japanese)
L:      tomoyo-users@lists.sourceforge.jp (subscribers-only, for users in
Japanese)
W:      http://tomoyo.sourceforge.jp/
T:      quilt http://svn.sourceforge.jp/svnroot/tomoyo/trunk/2.5.x/tomoyo-
lsm/patches/
S:      Maintained
F:      security/tomoyo/

TOPSTAR LAPTOP EXTRAS DRIVER
M:      Herton Ronaldo Krzesinski <herton@canonical.com>
L:      platform-driver-x86@vger.kernel.org
S:      Maintained
```

```
F:      drivers/platform/x86/topstar-laptop.c

TOSHIBA ACPI EXTRAS DRIVER
L:      platform-driver-x86@vger.kernel.org
S:      Orphan
F:      drivers/platform/x86/toshiba_acpi.c

TOSHIBA SMM DRIVER
M:      Jonathan Buzzard <jonathan@buzzard.org.uk>
L:      tlinux-users@tce.toshiba-dme.co.jp
W:      http://www.buzzard.org.uk/toshiba/
S:      Maintained
F:      drivers/char/toshiba.c
F:      include/linux/toshiba.h
F:      include/uapi/linux/toshiba.h

TMIO MMC DRIVER
M:      Guennadi Liakhovetski <g.liakhovetski@gmx.de>
M:      Ian Molton <ian@mnementh.co.uk>
L:      linux-mmc@vger.kernel.org
S:      Maintained
F:      drivers/mmc/host/tmio_mmc*
F:      drivers/mmc/host/sh_mobile_sdhi.c
F:      include/linux/mmc/tmio.h
F:      include/linux/mmc/sh_mobile_sdhi.h

TMP401 HARDWARE MONITOR DRIVER
M:      Guenter Roeck <linux@roeck-us.net>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/tmp401
F:      drivers/hwmon/tmp401.c

TMPFS (SHMEM FILESYSTEM)
M:      Hugh Dickins <hughd@google.com>
L:      linux-mm@kvack.org
S:      Maintained
F:      include/linux/shmem_fs.h
F:      mm/shmem.c

TM6000 VIDEO4LINUX DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Odd fixes
F:      drivers/media/usb/tm6000/

TPM DEVICE DRIVER
M:      Kent Yoder <key@linux.vnet.ibm.com>
M:      Rajiv Andrade <mail@srajiv.net>
W:      http://tpmdd.sourceforge.net
M:      Marcel Selhorst <tpmdd@selhorst.net>
M:      Sirrix AG <tpmdd@sirrix.com>
W:      http://www.sirrix.com
L:      tpmdd-devel@lists.sourceforge.net (moderated for non-subscribers)
S:      Maintained
```

```
F:      drivers/char/tpm/

TRACING
M:      Steven Rostedt <rostedt@goodmis.org>
M:      Frederic Weisbecker <fweisbec@gmail.com>
M:      Ingo Molnar <mingo@redhat.com>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tip/tip.git
perf/core
S:      Maintained
F:      Documentation/trace/ftrace.txt
F:      arch/*/*/*/ftrace.h
F:      arch/*/kernel/ftrace.c
F:      include/*/ftrace.h
F:      include/linux/trace*.h
F:      include/trace/
F:      kernel/trace/

TRIVIAL PATCHES
M:      Jiri Kosina <trivial@kernel.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jikos/trivial.git
S:      Maintained
K:      ^Subject:.*(?i)trivial

TTY LAYER
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
M:      Jiri Slaby <jslaby@suse.cz>
S:      Supported
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/gregkh/tty.git
F:      drivers/tty/
F:      drivers/tty/serial/serial_core.c
F:      include/linux/serial_core.h
F:      include/linux/serial.h
F:      include/linux/tty.h
F:      include/uapi/linux/serial_core.h
F:      include/uapi/linux/serial.h
F:      include/uapi/linux/tty.h

TUA9001 MEDIA DRIVER
M:      Antti Palosaari <crope@iki.fi>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org/
W:      http://palosaari.fi/linux/
Q:      http://patchwork.linuxtv.org/project/linux-media/list/
T:      git git://linuxtv.org/anttip/media_tree.git
S:      Maintained
F:      drivers/media/tuners/tua9001*

TULIP NETWORK DRIVERS
M:      Grant Grundler <grundler@parisc-linux.org>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/dec/tulip/

TUN/TAP driver
M:      Maxim Krasnyansky <maxk@qti.qualcomm.com>
W:      http://vtun.sourceforge.net/tun
S:      Maintained
```

```
F:      Documentation/networking/tuntap.txt
F:      arch/um/os-Linux/drivers/

TURBOCHANNEL SUBSYSTEM
M:      "Maciej W. Rozycki" <macro@linux-mips.org>
S:      Maintained
F:      drivers/tc/
F:      include/linux/tc.h

U14-34F SCSI DRIVER
M:      Dario Ballabio <ballabio_dario@emc.com>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/u14-34f.c

UBI FILE SYSTEM (UBIFS)
M:      Artem Bityutskiy <dedekind1@gmail.com>
M:      Adrian Hunter <adrian.hunter@intel.com>
L:      linux-mtd@lists.infradead.org
T:      git git://git.infradead.org/ubifs-2.6.git
W:      http://www.linux-mtd.infradead.org/doc/ubifs.html
S:      Maintained
F:      Documentation/filesystems/ubifs.txt
F:      fs/ubifs/

UCLINUX (AND M68KNOMMU)
M:      Greg Ungerer <gerg@uclinux.org>
W:      http://www.uclinux.org/
L:      uclinux-dev@uclinux.org  (subscribers-only)
S:      Maintained
F:      arch/m68k/*/*_no.*
F:      arch/m68k/include/asm/*_no.*

UCLINUX FOR RENESAS H8/300 (H8300)
M:      Yoshinori Sato <ysato@users.sourceforge.jp>
W:      http://uclinux-h8.sourceforge.jp/
S:      Supported
F:      arch/h8300/
F:      drivers/ide/ide-h8300.c
F:      drivers/net/ethernet/8390/ne-h8300.c

UDF FILESYSTEM
M:      Jan Kara <jack@suse.cz>
S:      Maintained
F:      Documentation/filesystems/udf.txt
F:      fs/udf/

UFS FILESYSTEM
M:      Evgeniy Dushistov <dushistov@mail.ru>
S:      Maintained
F:      Documentation/filesystems/ufs.txt
F:      fs/ufs/

UHID USERSPACE HID IO DRIVER:
M:      David Herrmann <dh.herrmann@googlemail.com>
L:      linux-input@vger.kernel.org
S:      Maintained
```

```
F:      drivers/hid/uhid.c
F:      include/uapi/linux/uhid.h

ULTRA-WIDEBAND (UWB) SUBSYSTEM:
L:      linux-usb@vger.kernel.org
S:      Orphan
F:      drivers/uwb/
F:      include/linux/uwb.h
F:      include/linux/uwb/

UNICORE32 ARCHITECTURE:
M:      Guan Xuetao <gxt@mprc.pku.edu.cn>
W:      http://mprc.pku.edu.cn/~guanxuetao/linux
S:      Maintained
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/epip/linux-2.6-
unicore32.git
F:      arch/unicore32/

UNIFDEF
M:      Tony Finch <dot@dotat.at>
W:      http://dotat.at/prog/unifdef
S:      Maintained
F:      scripts/unifdef.c

UNIFORM CDROM DRIVER
M:      Jens Axboe <axboe@kernel.dk>
W:      http://www.kernel.dk
S:      Maintained
F:      Documentation/cdrom/
F:      drivers/cdrom/cdrom.c
F:      include/linux/cdrom.h
F:      include/uapi/linux/cdrom.h

UNIVERSAL FLASH STORAGE HOST CONTROLLER DRIVER
M:      Vinayak Holikatti <vinholikatti@gmail.com>
M:      Santosh Y <santoshsy@gmail.com>
L:      linux-scsi@vger.kernel.org
S:      Supported
F:      Documentation/scsi/ufs.txt
F:      drivers/scsi/ufs/

UNSORTED BLOCK IMAGES (UBI)
M:      Artem Bityutskiy <dedekind1@gmail.com>
W:      http://www.linux-mtd.infradead.org/
L:      linux-mtd@lists.infradead.org
T:      git git://git.infradead.org/ubi-2.6.git
S:      Maintained
F:      drivers/mtd/ubi/
F:      include/linux/mtd/ubi.h
F:      include/uapi/mtd/ubi-user.h

UNSORTED BLOCK IMAGES (UBI) Fastmap
M:      Richard Weinberger <richard@nod.at>
L:      linux-mtd@lists.infradead.org
S:      Maintained
F:      drivers/mtd/ubi/fastmap.c
```

```
USB ACM DRIVER
M:      Oliver Neukum <oliver@neukum.org>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      Documentation/usb/acm.txt
F:      drivers/usb/class/cdc-acm.*

USB AR5523 WIRELESS DRIVER
M:      Pontus Fuchs <pontus.fuchs@gmail.com>
L:      linux-wireless@vger.kernel.org
S:      Maintained
F:      drivers/net/wireless/ath/ar5523/

USB ATTACHED SCSI
M:      Matthew Wilcox <willy@linux.intel.com>
M:      Sarah Sharp <sarah.a.sharp@linux.intel.com>
M:      Gerd Hoffmann <kraxel@redhat.com>
L:      linux-usb@vger.kernel.org
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/usb/storage/uas.c

USB CDC ETHERNET DRIVER
M:      Oliver Neukum <oliver@neukum.org>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/net/usb/cdc_*.c
F:      include/uapi/linux/usb/cdc.h

USB CYPRESS C67X00 DRIVER
M:      Peter Korsgaard <jacmet@sunsite.dk>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/c67x00/

USB DAVICOM DM9601 DRIVER
M:      Peter Korsgaard <jacmet@sunsite.dk>
L:      netdev@vger.kernel.org
W:      http://www.linux-usb.org/usbnet
S:      Maintained
F:      drivers/net/usb/dm9601.c

USB DIAMOND RIO500 DRIVER
M:      Cesar Miquel <miquel@df.uba.ar>
L:      rio500-users@lists.sourceforge.net
W:      http://rio500.sourceforge.net
S:      Maintained
F:      drivers/usb/misc/rio500*

USB EHCI DRIVER
M:      Alan Stern <stern@rowland.harvard.edu>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      Documentation/usb/ehci.txt
F:      drivers/usb/host/ehci*

USB GADGET/PERIPHERAL SUBSYSTEM
```

```
M:      Felipe Balbi <balbi@ti.com>
L:      linux-usb@vger.kernel.org
W:      http://www.linux-usb.org/gadget
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/balbi/usb.git
S:      Maintained
F:      drivers/usb/gadget/
F:      include/linux/usb/gadget*

USB HID/HIDBP DRIVERS (USB KEYBOARDS, MICE, REMOTE CONTROLS, ...)
M:      Jiri Kosina <jkosina@suse.cz>
L:      linux-usb@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/jikos/hid.git
S:      Maintained
F:      Documentation/hid/hiddev.txt
F:      drivers/hid/usbhid/

USB/IP DRIVERS
M:      Matt Mooney <mfm@muteddisk.com>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/staging/usbip/

USB ISP116X DRIVER
M:      Olav Kongas <ok@artecdesign.ee>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/host/isp116x*
F:      include/linux/usb/isp116x.h

USB KAWASAKI LSI DRIVER
M:      Oliver Neukum <oliver@neukum.org>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/serial/kl5kusb105.*

USB MASS STORAGE DRIVER
M:      Matthew Dharm <mdharm-usb@one-eyed-alien.net>
L:      linux-usb@vger.kernel.org
L:      usb-storage@lists.one-eyed-alien.net
S:      Maintained
W:      http://www.one-eyed-alien.net/~mdharm/linux-usb/
F:      drivers/usb/storage/

USB MIDI DRIVER
M:      Clemens Ladisch <clemens@ladisch.de>
L:      alsa-devel@alsa-project.org (moderated for non-subscribers)
T:      git git://git.alsa-project.org/alsa-kernel.git
S:      Maintained
F:      sound/usb/midi.*

USB OHCI DRIVER
M:      Alan Stern <stern@rowland.harvard.edu>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      Documentation/usb/ohci.txt
F:      drivers/usb/host/ohci*
```

```
USB OPTION-CARD DRIVER
M:      Matthias Urlichs <smurf@smurf.noris.de>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/serial/option.c

USB PEGASUS DRIVER
M:      Petko Manolov <petkan@nucleusys.com>
L:      linux-usb@vger.kernel.org
L:      netdev@vger.kernel.org
T:      git git://git.code.sf.net/p/pegasus2/git
W:      http://pegasus2.sourceforge.net/
S:      Maintained
F:      drivers/net/usb/pegasus.*

USB PHY LAYER
M:      Felipe Balbi <balbi@ti.com>
L:      linux-usb@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/balbi/usb.git
S:      Maintained
F:      drivers/usb/phy/
F:      drivers/usb/otg/

USB PRINTER DRIVER (usblp)
M:      Pete Zaitcev <zaitcev@redhat.com>
L:      linux-usb@vger.kernel.org
S:      Supported
F:      drivers/usb/class/usblp.c

USB RTL8150 DRIVER
M:      Petko Manolov <petkan@nucleusys.com>
L:      linux-usb@vger.kernel.org
L:      netdev@vger.kernel.org
T:      git git://git.code.sf.net/p/pegasus2/git
W:      http://pegasus2.sourceforge.net/
S:      Maintained
F:      drivers/net/usb/rtl8150.c

USB SERIAL BELKIN F5U103 DRIVER
M:      William Greathouse <wgreathouse@smva.com>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/serial/belkin_sa.*

USB SERIAL CYPRESS M8 DRIVER
M:      Lonnie Mendez <dignome@gmail.com>
L:      linux-usb@vger.kernel.org
S:      Maintained
W:      http://geocities.com/i0xox0i
W:      http://firstlight.net/cvs
F:      drivers/usb/serial/cypress_m8.*

USB SERIAL CYBERJACK DRIVER
M:      Matthias Bruestle and Harald Welte <support@reiner-sct.com>
W:      http://www.reiner-sct.de/support/treiber_cyberjack.php
S:      Maintained
F:      drivers/usb/serial/cyberjack.c
```

```
USB SERIAL DIGI ACCELEPORT DRIVER
M:      Peter Berger <pberger@brimson.com>
M:      Al Borchers <alborchers@steinerpoint.com>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/serial/digi_acceleport.c

USB SERIAL DRIVER
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
L:      linux-usb@vger.kernel.org
S:      Supported
F:      Documentation/usb/usb-serial.txt
F:      drivers/usb/serial/generic.c
F:      drivers/usb/serial/usb-serial.c
F:      include/linux/usb/serial.h

USB SERIAL EMPEG EMPEG-CAR MARK I/II DRIVER
M:      Gary Brubaker <xavyer@ix.netcom.com>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/serial/empeg.c

USB SERIAL KEYSPAN DRIVER
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/serial/*keyspan*

USB SERIAL WHITEHEAT DRIVER
M:      Support Department <support@connecttech.com>
L:      linux-usb@vger.kernel.org
W:      http://www.connecttech.com
S:      Supported
F:      drivers/usb/serial/whiteheat*

USB SMSC75XX ETHERNET DRIVER
M:      Steve Glendinning <steve.glendinning@shawell.net>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/usb/smsc75xx.*

USB SMSC95XX ETHERNET DRIVER
M:      Steve Glendinning <steve.glendinning@shawell.net>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/usb/smsc95xx.*

USB SN9C1xx DRIVER
M:      Luca Risolia <luca.risolia@studio.unibo.it>
L:      linux-usb@vger.kernel.org
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://www.linux-projects.org
S:      Maintained
F:      Documentation/video4linux/sn9c102.txt
F:      drivers/media/usb/sn9c102/
```

```
USB SUBSYSTEM
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
L:      linux-usb@vger.kernel.org
W:      http://www.linux-usb.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/gregkh/usb.git
S:      Supported
F:      Documentation/usb/
F:      drivers/net/usb/
F:      drivers/usb/
F:      include/linux/usb.h
F:      include/linux/usb/

USB UHCI DRIVER
M:      Alan Stern <stern@rowland.harvard.edu>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/host/uhci*

USB "USBNET" DRIVER FRAMEWORK
M:      Oliver Neukum <oneukum@suse.de>
L:      netdev@vger.kernel.org
W:      http://www.linux-usb.org/usbnet
S:      Maintained
F:      drivers/net/usb/usbnet.c
F:      include/linux/usb/usbnet.h

USB VIDEO CLASS
M:      Laurent Pinchart <laurent.pinchart@ideasonboard.com>
L:      linux-uvc-devel@lists.sourceforge.net (subscribers-only)
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://www.ideasonboard.org/uvc/
S:      Maintained
F:      drivers/media/usb/uvc/
F:      include/uapi/linux/uvcvideo.h

USB VISION DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Odd Fixes
F:      drivers/media/usb/usbvision/

USB WEBCAM GADGET
M:      Laurent Pinchart <laurent.pinchart@ideasonboard.com>
L:      linux-usb@vger.kernel.org
S:      Maintained
F:      drivers/usb/gadget/*uvc*.c
F:      drivers/usb/gadget/webcam.c

USB WIRELESS RNDIS DRIVER (rndis_wlan)
M:      Jussi Kivilinna <jussi.kivilinna@iki.fi>
L:      linux-wireless@vger.kernel.org
S:      Maintained
F:      drivers/net/wireless/rndis_wlan.c
```

```
USB XHCI DRIVER
M:      Sarah Sharp <sarah.a.sharp@linux.intel.com>
L:      linux-usb@vger.kernel.org
S:      Supported
F:      drivers/usb/host/xhci*
F:      drivers/usb/host/pci-quirks*

USB ZD1201 DRIVER
L:      linux-wireless@vger.kernel.org
W:      http://linux-lc100020.sourceforge.net
S:      Orphan
F:      drivers/net/wireless/zd1201.*

USB ZR364XX DRIVER
M:      Antoine Jacquet <royale@zerezo.com>
L:      linux-usb@vger.kernel.org
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://royale.zerezo.com/zr364xx/
S:      Maintained
F:      Documentation/video4linux/zr364xx.txt
F:      drivers/media/usb/zr364xx/

USER-MODE LINUX (UML)
M:      Jeff Dike <jdike@addtoit.com>
M:      Richard Weinberger <richard@nod.at>
L:      user-mode-linux-devel@lists.sourceforge.net
L:      user-mode-linux-user@lists.sourceforge.net
W:      http://user-mode-linux.sourceforge.net
S:      Maintained
F:      Documentation/virtual/uml/
F:      arch/um/
F:      arch/x86/um/
F:      fs/hostfs/
F:      fs/hppfs/

USERSPACE I/O (UIO)
M:      "Hans J. Koch" <hjk@hansjkoch.de>
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
S:      Maintained
F:      Documentation/DocBook/uio-howto.tmpl
F:      drivers/uio/
F:      include/linux/uio*.h

UTIL-LINUX PACKAGE
M:      Karel Zak <kzak@redhat.com>
L:      util-linux@vger.kernel.org
W:      http://en.wikipedia.org/wiki/Util-linux
T:      git git://git.kernel.org/pub/scm/utils/util-linux/util-linux.git
S:      Maintained

UVESAFB DRIVER
M:      Michal Januszewski <spock@gentoo.org>
L:      linux-fbdev@vger.kernel.org
W:      http://dev.gentoo.org/~spock/projects/uvesafb/
S:      Maintained
```

```
F:      Documentation/fb/uvesafb.txt
F:      drivers/video/uvesafb.*

VFAT/FAT/MSDOS FILESYSTEM
M:      OGAWA Hirofumi <hirofumi@mail.parknet.co.jp>
S:      Maintained
F:      Documentation/filesystems/vfat.txt
F:      fs/fat/

VFIO DRIVER
M:      Alex Williamson <alex.williamson@redhat.com>
L:      kvm@vger.kernel.org
S:      Maintained
F:      Documentation/vfio.txt
F:      drivers/vfio/
F:      include/linux/vfio.h
F:      include/uapi/linux/vfio.h

VIDEOBUF2 FRAMEWORK
M:      Pawel Osciak <pawel@osciak.com>
M:      Marek Szyprowski <m.szyprowski@samsung.com>
M:      Kyungmin Park <kyungmin.park@samsung.com>
L:      linux-media@vger.kernel.org
S:      Maintained
F:      drivers/media/v4l2-core/videobuf2-*
F:      include/media/videobuf2-*

VIRTIO CONSOLE DRIVER
M:      Amit Shah <amit.shah@redhat.com>
L:      virtualization@lists.linux-foundation.org
S:      Maintained
F:      drivers/char/virtio_console.c
F:      include/linux/virtio_console.h
F:      include/uapi/linux/virtio_console.h

VIRTIO CORE, NET AND BLOCK DRIVERS
M:      Rusty Russell <rusty@rustcorp.com.au>
M:      "Michael S. Tsirkin" <mst@redhat.com>
L:      virtualization@lists.linux-foundation.org
S:      Maintained
F:      drivers/virtio/
F:      drivers/net/virtio_net.c
F:      drivers/block/virtio_blk.c
F:      include/linux/virtio_*.h
F:      include/uapi/linux/virtio_*.h

VIRTIO HOST (VHOST)
M:      "Michael S. Tsirkin" <mst@redhat.com>
L:      kvm@vger.kernel.org
L:      virtualization@lists.linux-foundation.org
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/vhost/
F:      include/uapi/linux/vhost.h

VIA RHINE NETWORK DRIVER
M:      Roger Luethi <rl@hellgate.ch>
```

```
S:      Maintained
F:      drivers/net/ethernet/via/via-rhine.c

VIA SD/MMC CARD CONTROLLER DRIVER
M:      Bruce Chang <brucechang@via.com.tw>
M:      Harald Welte <HaraldWelte@viatech.com>
S:      Maintained
F:      drivers/mmc/host/via-sdmmc.c

VIA UNICHROME(PRO)/CHROME9 FRAMEBUFFER DRIVER
M:      Florian Tobias Schandinat <FlorianSchandinat@gmx.de>
L:      linux-fbdev@vger.kernel.org
S:      Maintained
F:      include/linux/via-core.h
F:      include/linux/via-gpio.h
F:      include/linux/via_i2c.h
F:      drivers/video/via/

VIA VELOCITY NETWORK DRIVER
M:      Francois Romieu <romieu@fr.zoreil.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/ethernet/via/via-velocity.*

VIVI VIRTUAL VIDEO DRIVER
M:      Hans Verkuil <hverkuil@xs4all.nl>
L:      linux-media@vger.kernel.org
T:      git git://linuxtv.org/media_tree.git
W:      http://linuxtv.org
S:      Maintained
F:      drivers/media/platform/vivi*

VLAN (802.1Q)
M:      Patrick McHardy <kaber@trash.net>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/macvlan.c
F:      include/linux/if_*vlan.h
F:      net/8021q/

VLYNQ BUS
M:      Florian Fainelli <florian@openwrt.org>
L:      openwrt-devel@lists.openwrt.org (subscribers-only)
S:      Maintained
F:      drivers/vlynq/vlynq.c
F:      include/linux/vlynq.h

VME SUBSYSTEM
M:      Martyn Welch <martyn.welch@ge.com>
M:      Manohar Vanga <manohar.vanga@gmail.com>
M:      Greg Kroah-Hartman <gregkh@linuxfoundation.org>
L:      devel@driverdev.osuosl.org
S:      Maintained
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/gregkh/driver-
core.git
F:      Documentation/vme_api.txt
F:      drivers/staging/vme/
```

```
F:      drivers/vme/
F:      include/linux/vme*

VMWARE VMXNET3 ETHERNET DRIVER
M:      Shreyas Bhatewara <sbhatewara@vmware.com>
M:      "VMware, Inc." <pv-drivers@vmware.com>
L:      netdev@vger.kernel.org
S:      Maintained
F:      drivers/net/vmxnet3/

VMware PVSCSI driver
M:      Arvind Kumar <arvindkumar@vmware.com>
M:      VMware PV-Drivers <pv-drivers@vmware.com>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/vmw_pvscsi.c
F:      drivers/scsi/vmw_pvscsi.h

VOLTAGE AND CURRENT REGULATOR FRAMEWORK
M:      Liam Girdwood <lgirdwood@gmail.com>
M:      Mark Brown <broonie@kernel.org>
W:      http://opensource.wolfsonmicro.com/node/15
W:      http://www.slimlogic.co.uk/?p=48
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/lrg/regulator.git
S:      Supported
F:      drivers/regulator/
F:      include/linux/regulator/

VT1211 HARDWARE MONITOR DRIVER
M:      Juerg Haefliger <juergh@gmail.com>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/vt1211
F:      drivers/hwmon/vt1211.c

VT8231 HARDWARE MONITOR DRIVER
M:      Roger Lucas <vt8231@hiddenengine.co.uk>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/vt8231.c

VUB300 USB to SDIO/SD/MMC bridge chip
M:      Tony Olech <tony.olech@elandigitalsystems.com>
L:      linux-mmc@vger.kernel.org
L:      linux-usb@vger.kernel.org
S:      Supported
F:      drivers/mmc/host/vub300.c

W1 DALLAS'S 1-WIRE BUS
M:      Evgeniy Polyakov <zbr@ioremap.net>
S:      Maintained
F:      Documentation/w1/
F:      drivers/w1/

W83791D HARDWARE MONITORING DRIVER
M:      Marc Hulsman <m.hulsman@tudelft.nl>
L:      lm-sensors@lm-sensors.org
```

```
S:      Maintained
F:      Documentation/hwmon/w83791d
F:      drivers/hwmon/w83791d.c

W83793 HARDWARE MONITORING DRIVER
M:      Rudolf Marek <r.marek@assembler.cz>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      Documentation/hwmon/w83793
F:      drivers/hwmon/w83793.c

W83795 HARDWARE MONITORING DRIVER
M:      Jean Delvare <khali@linux-fr.org>
L:      lm-sensors@lm-sensors.org
S:      Maintained
F:      drivers/hwmon/w83795.c

W83L51xD SD/MMC CARD INTERFACE DRIVER
M:      Pierre Ossman <pierre@ossman.eu>
S:      Maintained
F:      drivers/mmc/host/wbsd.*

WATCHDOG DEVICE DRIVERS
M:      Wim Van Sebroeck <wim@iguana.be>
L:      linux-watchdog@vger.kernel.org
W:      http://www.linux-watchdog.org/
T:      git git://www.linux-watchdog.org/linux-watchdog.git
S:      Maintained
F:      Documentation/watchdog/
F:      drivers/watchdog/
F:      include/linux/watchdog.h
F:      include/uapi/linux/watchdog.h

WD7000 SCSI DRIVER
M:      Miroslav Zagorac <zaga@fly.cc.fer.hr>
L:      linux-scsi@vger.kernel.org
S:      Maintained
F:      drivers/scsi/wd7000.c

WIIMOTE HID DRIVER
M:      David Herrmann <dh.herrmann@googlemail.com>
L:      linux-input@vger.kernel.org
S:      Maintained
F:      drivers/hid/hid-wiimote*

WINBOND CIR DRIVER
M:      David Härdeman <david@hardeman.nu>
S:      Maintained
F:      drivers/media/rc/winbond-cir.c

WIMAX STACK
M:      Inaky Perez-Gonzalez <inaky.perez-gonzalez@intel.com>
M:      linux-wimax@intel.com
L:      wimax@linuxwimax.org
S:      Supported
W:      http://linuxwimax.org
F:      Documentation/wimax/README.wimax
```

```
F:      include/linux/wimax/debug.h
F:      include/net/wimax.h
F:      include/uapi/linux/wimax.h
F:      net/wimax/

WISTRON LAPTOP BUTTON DRIVER
M:      Miloslav Trmac <mitr@volny.cz>
S:      Maintained
F:      drivers/input/misc/wistron_btns.c

WL3501 WIRELESS PCMCIA CARD DRIVER
M:      Arnaldo Carvalho de Melo <acme@ghostprotocols.net>
L:      linux-wireless@vger.kernel.org
W:      http://oops.ghostprotocols.net:81/blog
S:      Maintained
F:      drivers/net/wireless/wl3501*

WM97XX TOUCHSCREEN DRIVERS
M:      Mark Brown <broonie@kernel.org>
M:      Liam Girdwood <lrg@slimlogic.co.uk>
L:      linux-input@vger.kernel.org
T:      git git://opensource.wolfsonmicro.com/linux-2.6-touch
W:      http://opensource.wolfsonmicro.com/node/7
S:      Supported
F:      drivers/input/touchscreen/*wm97*
F:      include/linux/wm97xx.h

WOLFSON MICROELECTRONICS DRIVERS
L:      patches@opensource.wolfsonmicro.com
T:      git git://opensource.wolfsonmicro.com/linux-2.6-asoc
T:      git git://opensource.wolfsonmicro.com/linux-2.6-audioplus
W:      http://opensource.wolfsonmicro.com/content/linux-drivers-wolfson-
devices
S:      Supported
F:      Documentation/hwmon/wm83??
F:      arch/arm/mach-s3c64xx/mach-crag6410*
F:      drivers/clk/clk-wm83*.c
F:      drivers/extcon/extcon-arizona.c
F:      drivers/leds/leds-wm83*.c
F:      drivers/gpio/gpio-*wm*.c
F:      drivers/gpio/gpio-arizona.c
F:      drivers/hwmon/wm83??-hwmon.c
F:      drivers/input/misc/wm831x-on.c
F:      drivers/input/touchscreen/wm831x-ts.c
F:      drivers/input/touchscreen/wm97*.c
F:      drivers/mfd/arizona*
F:      drivers/mfd/wm*.c
F:      drivers/power/wm83*.c
F:      drivers/rtc/rtc-wm83*.c
F:      drivers/regulator/wm8*.c
F:      drivers/video/backlight/wm83*_bl.c
F:      drivers/watchdog/wm83*_wdt.c
F:      include/linux/mfd/arizona/
F:      include/linux/mfd/wm831x/
F:      include/linux/mfd/wm8350/
F:      include/linux/mfd/wm8400*
F:      include/linux/wm97xx.h
```

```
F:      include/sound/wm????.h
F:      sound/soc/codecs/arizona.?
F:      sound/soc/codecs/wm*

WORKQUEUE
M:      Tejun Heo <tj@kernel.org>
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tj/wq.git
S:      Maintained
F:      include/linux/workqueue.h
F:      kernel/workqueue.c
F:      Documentation/workqueue.txt

X.25 NETWORK LAYER
M:      Andrew Hendry <andrew.hendry@gmail.com>
L:      linux-x25@vger.kernel.org
S:      Odd Fixes
F:      Documentation/networking/x25*
F:      include/net/x25*
F:      net/x25/

X86 ARCHITECTURE (32-BIT AND 64-BIT)
M:      Thomas Gleixner <tglx@linutronix.de>
M:      Ingo Molnar <mingo@redhat.com>
M:      "H. Peter Anvin" <hpa@zytor.com>
M:      x86@kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/tip/tip.git x86/core
S:      Maintained
F:      Documentation/x86/
F:      arch/x86/

X86 PLATFORM DRIVERS
M:      Matthew Garrett <matthew.garrett@nebula.com>
L:      platform-driver-x86@vger.kernel.org
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/mjg59/platform-
drivers-x86.git
S:      Maintained
F:      drivers/platform/x86

X86 MCE INFRASTRUCTURE
M:      Tony Luck <tony.luck@intel.com>
M:      Borislav Petkov <bp@alien8.de>
L:      linux-edac@vger.kernel.org
S:      Maintained
F:      arch/x86/kernel/cpu/mcheck/*

XC2028/3028 TUNER DRIVER
M:      Mauro Carvalho Chehab <mchehab@redhat.com>
L:      linux-media@vger.kernel.org
W:      http://linuxtv.org
T:      git git://linuxtv.org/media_tree.git
S:      Maintained
F:      drivers/media/tuners/tuner-xc2028.*

XEN HYPERVISOR INTERFACE
M:      Konrad Rzeszutek Wilk <konrad.wilk@oracle.com>
M:      Jeremy Fitzhardinge <jeremy@goop.org>
L:      xen-devel@lists.xensource.com (moderated for non-subscribers)
```

```
L:      virtualization@lists.linux-foundation.org
S:      Supported
F:      arch/x86/xen/
F:      drivers/*/xen-*front.c
F:      drivers/xen/
F:      arch/x86/include/asm/xen/
F:      include/xen/
F:      include/uapi/xen/

XEN HYPERVISOR ARM
M:      Stefano Stabellini <stefano.stabellini@eu.citrix.com>
L:      xen-devel@lists.xensource.com (moderated for non-subscribers)
S:      Supported
F:      arch/arm/xen/
F:      arch/arm/include/asm/xen/

XEN NETWORK BACKEND DRIVER
M:      Ian Campbell <ian.campbell@citrix.com>
L:      xen-devel@lists.xensource.com (moderated for non-subscribers)
L:      netdev@vger.kernel.org
S:      Supported
F:      drivers/net/xen-netback/*

XEN PCI SUBSYSTEM
M:      Konrad Rzeszutek Wilk <konrad.wilk@oracle.com>
L:      xen-devel@lists.xensource.com (moderated for non-subscribers)
S:      Supported
F:      arch/x86/pci/*xen*
F:      drivers/pci/*xen*

XEN SWIOTLB SUBSYSTEM
M:      Konrad Rzeszutek Wilk <konrad.wilk@oracle.com>
L:      xen-devel@lists.xensource.com (moderated for non-subscribers)
S:      Supported
F:      arch/x86/xen/*swiotlb*
F:      drivers/xen/*swiotlb*

XFS FILESYSTEM
P:      Silicon Graphics Inc
M:      Ben Myers <bpm@sgi.com>
M:      Alex Elder <elder@kernel.org>
M:      xfs@oss.sgi.com
L:      xfs@oss.sgi.com
W:      http://oss.sgi.com/projects/xfs
T:      git git://oss.sgi.com/xfs/xfs.git
S:      Supported
F:      Documentation/filesystems/xfs.txt
F:      fs/xfs/

XILINX AXI ETHERNET DRIVER
M:      Anirudha Sarangi <anirudh@xilinx.com>
M:      John Linn <John.Linn@xilinx.com>
S:      Maintained
F:      drivers/net/ethernet/xilinx/xilinx_axienet*

XILINX SYSTEMACE DRIVER
S:      Unmaintained
```

```
F:      drivers/block/xsysace.c

XILINX UARTLITE SERIAL DRIVER
M:      Peter Korsgaard <jacmet@sunsite.dk>
L:      linux-serial@vger.kernel.org
S:      Maintained
F:      drivers/tty/serial/uartlite.c

YAM DRIVER FOR AX.25
M:      Jean-Paul Roubelat <jpr@f6fbb.org>
L:      linux-hams@vger.kernel.org
S:      Maintained
F:      drivers/net/hamradio/yam*
F:      include/linux/yam.h

YEALINK PHONE DRIVER
M:      Henk Vergonet <Henk.Vergonet@gmail.com>
L:      usbb2k-api-dev@nongnu.org
S:      Maintained
F:      Documentation/input/yealink.txt
F:      drivers/input/misc/yealink.*

Z8530 DRIVER FOR AX.25
M:      Joerg Reuter <jreuter@yaina.de>
W:      http://yaina.de/jreuter/
W:      http://www.qsl.net/dl1bke/
L:      linux-hams@vger.kernel.org
S:      Maintained
F:      Documentation/networking/z8530drv.txt
F:      drivers/net/hamradio/*scc.c
F:      drivers/net/hamradio/z8530.h

ZD1211RW WIRELESS DRIVER
M:      Daniel Drake <dsd@gentoo.org>
M:      Ulrich Kunitz <kune@deine-taler.de>
W:      http://zd1211.ath.cx/wiki/DriverRewrite
L:      linux-wireless@vger.kernel.org
L:      zd1211-devs@lists.sourceforge.net (subscribers-only)
S:      Maintained
F:      drivers/net/wireless/zd1211rw/

ZR36067 VIDEO FOR LINUX DRIVER
L:      mjpeg-users@lists.sourceforge.net
L:      linux-media@vger.kernel.org
W:      http://mjpeg.sourceforge.net/driver-zoran/
T:      Mercurial http://linuxtv.org/hg/v4l-dvb
S:      Odd Fixes
F:      drivers/media/pci/zoran/

ZS DECSTATION Z85C30 SERIAL DRIVER
M:      "Maciej W. Rozycki" <macro@linux-mips.org>
S:      Maintained
F:      drivers/tty/serial/zs.*

THE REST
M:      Linus Torvalds <torvalds@linux-foundation.org>
L:      linux-kernel@vger.kernel.org
```

```
Q:      http://patchwork.kernel.org/project/LKML/list/
T:      git git://git.kernel.org/pub/scm/linux/kernel/git/torvalds/linux.git
S:      Buried alive in reporters
F:      *
F:      */
```

todo-list - Our current TODO list

**Contents**


1. cfg80211
   1. Regulatory
   2. Issues
2. mac80211
   1. Mesh
   2. AP support
   3. Issues
   4. Improvements
   5. power saving
   6. Offchannel work
3. drivers
4. testing
5. wireless.kernel.org site


## cfg80211

### Regulatory

- Regulatory TODO

### Issues

- make scan timeout variable depending on scan length, in case scans take longer than the current 15 seconds

## mac80211

### Mesh

- If a mesh join request does not come with a frequency, initiate scan for suitable neighbor MBSS frequency first.

### AP support

- AP DFS or AP radar detection
- local->total_ps_buffered is totally racy

### Issues

- drivers with IV offload do not correctly report IV/PN to nl80211
- Need to stop TX/RX when a radar is detected for the duration of scan for a new channel.

### Improvements

- reset the connection and beacon monitor timers when we are able to successfully TX data to an AP (we currently do it on RX)
- move survey caching code from ath9k to mac80211 so that other drivers can simply update channel survey data once and all cached data can be sent back to userspace as ath9k does it
- improve roaming time by collapsing synchronize_rcu() (or even getting rid of it by using call_rcu()) in station/key management

### power saving

- move checking for broadcast / multicast frames to mac80211 before going to PS. ath9k already has some code for this, this should be moved to mac80211. Or just extend documentation to indicate drivers are required to do this.
- 11v support (eventually)
- implement a PS library, a la described in http://marc.info/?l=linux-wireless&m=135838252227053

### Offchannel work

- optimise "offchannel" to not stop beaconing/traffic/etc. when using the operating channel
- implement addBA in terms off "offchannel" on the operating channel so it blocks other offchannel while waiting for a response
- don't time out RX BA agreements while offchannel
- do TX flushing as appropriate
- Wait for DTIM beacon and multicast traffic before going offchannel

### drivers

- convert drivers to cfg80211

### testing

- client powersave testing
- q/a procedure for stack
- winlab
- info on test coverage
- tests themselves need to be documented
- instructions how to run tests

### wireless.kernel.org site

- fix CSS colours, for example link colours (if you want to start, look at the files in moin/linuxwireless/css/and send diffs to <johannes AT sipsolutions DOT net>)
- fix print view to include a black&white logo

Firmware versioning - Suggested firmware versioning rules

## Contents


1. Firmware versioning best practices
2. Firmware file guidelines for 802.11
   1. Firmware API and version numbers
   2. API and version number bumps
   3. Deprecating old firmware APIs
3. Firmware file guidelines for Bluetooth


### Firmware versioning best practices

On this page we document how you should deal with firmware versioning for both proprietary firmware and open firmware for 802.11 and the Bluetooth subsystems of the Linux kernel. This includes aspects regarding API changes in the firmware and changes when you do not make API changes.

### Firmware file guidelines for 802.11

#### Firmware API and version numbers

You should use foo-apiversion-codeversion.fw . The apiversion would change when there are API changes within the firmware that require actual driver changes. If you are just doing simple updates you would just bump up the codeversion. The driver can then simply use the API version for the actual filename and it can be symlinked to the latest codeversion for that API.

For example say you have a firmware on API 3, and its code revision is 1.4.1. The firmware would be named:

```
foo-3-1.4.1.fw
```

As a short hand this would be symlinked to:

```
foo-3.fw
```

#### API and version number bumps

The general rule of thumb is that if you break or change the firmware API firmware name that the driver uses should change, the API number being bumped once. For example if you have some new driver functionality that requires new firmware then you should use a new firmware name. If your firmware code changes do not involve breaking the driver API then you can keep the API version the same. It is up to you how you deal with the code version changes.

In general if you are just providing bug fixes you do not need to provide a new firmware filename for the module, using the old filename is fine so long as the same API was kept.

### Deprecating old firmware APIs

TBD

### Firmware file guidelines for Bluetooth

Bluetootooth devices end up working with the Linux kernel using HCI so typically all you need to do is upload the firmware for a device and then let the Bluetooth subsystem take over. Since the API is static and standard you should always use one filename for firmware for Bluetooth devices and simply replace the old firmware with a new firmware on the linux-firmware.git tree.

Linux Kernel Wireless (802.11) Implementation - some implementation details

**Linux Wireless Subsystem**

By Rami Rosen

see: https://www.linuxfoundation.org/collaborate/workgroups/networking/linux-wireless-subsystem-80211-rami-rosen

## Other interesting information

- channel list

| Frequency | Channel | spacing | Country/RegClass (list) |
|---|---|---|---|
| 2412 | 1 | 25 | US/12, EU/4, JP/30 |
| 2412 | 1 | 40 | US/32, EU/11, JP/56 |
| 2417 | 2 | 25 | US/12, EU/4, JP/30 |
| 2417 | 2 | 40 | US/32, EU/11, JP/56 |
| 2422 | 3 | 25 | US/12, EU/4, JP/30 |
| 2422 | 3 | 40 | US/32, EU/11, JP/56 |
| 2427 | 4 | 25 | US/12, EU/4, JP/30 |
| 2427 | 4 | 40 | US/32, EU/11, JP/56 |
| 2432 | 5 | 25 | US/12, EU/4, JP/30 |
| 2432 | 5 | 40 | US/32, US/33, EU/11, EU/12, JP/56, JP/57 |
| 2437 | 6 | 25 | US/12, EU/4, JP/30 |
| 2437 | 6 | 40 | US/32, US/33, EU/11, EU/12, JP/56, JP/57 |
| 2442 | 7 | 25 | US/12, EU/4, JP/30 |
| 2442 | 7 | 40 | US/32, US/33, EU/11, EU/12, JP/56, JP/57 |
| 2447 | 8 | 25 | US/12, EU/4, JP/30 |
| 2447 | 8 | 40 | US/33, EU/11, EU/12, JP/56, JP/57 |
| 2452 | 9 | 25 | US/12, EU/4, JP/30 |
| 2452 | 9 | 40 | US/33, EU/11, EU/12, JP/56, JP/57 |
| 2457 | 10 | 25 | US/12, EU/4, JP/30 |
| 2457 | 10 | 40 | US/33, EU/12, JP/57 |
| 2462 | 11 | 25 | US/12, EU/4, JP/30 |
| 2462 | 11 | 40 | US/33, EU/12, JP/57 |
| 2467 | 12 | 25 | EU/4, JP/30 |
| 2467 | 12 | 40 | EU/12, JP/57 |
| 2472 | 13 | 25 | EU/4, JP/30 |
| 2472 | 13 | 40 | EU/12, JP/57 |
| 2484 | 14 | 25 | JP/31 |
| 3657.5 | 131 | 5 | US/15 |

| | | | |
|---|---|---|---|
| 3660 | 132 | 10 | US/14 |
| 3662.5 | 132 | 5 | US/15 |
| 3665 | 133 | 20 | US/13 |
| 3667.5 | 133 | 5 | US/15 |
| 3670 | 134 | 10 | US/14 |
| 3672.5 | 134 | 5 | US/15 |
| 3677.5 | 135 | 5 | US/15 |
| 3680 | 136 | 10 | US/14 |
| 3682.5 | 136 | 5 | US/15 |
| 3685 | 137 | 20 | US/13 |
| 3687.5 | 137 | 5 | US/15 |
| 3690 | 132 | 10 | US/14 |
| 3692.5 | 138 | 5 | US/15 |
| 4912.5 | 182 | 5 | JP/25, JP/26, JP/27, JP/28, JP/29 |
| 4915 | 183 | 10 | JP/16, JP/17, JP/18, JP/19, JP/20 |
| 4917.5 | 183 | 5 | JP/25, JP/26, JP/27, JP/28, JP/29 |
| 4920 | 184 | 10 | JP/16, JP/17, JP/18, JP/19, JP/20 |
| 4920 | 184 | 20 | JP/7, JP/8, JP/9, JP/10, JP/11 |
| 4920 | 184 | 40 | JP/46, JP/47, JP/48, JP/49, JP/50 |
| 4922.5 | 184 | 5 | JP/25, JP/26, JP/27, JP/28, JP/29 |
| 4925 | 185 | 10 | JP/16, JP/17, JP/18, JP/19, JP/20 |
| 4927.5 | 185 | 5 | JP/25, JP/26, JP/27, JP/28, JP/29 |
| 4932.5 | 186 | 5 | JP/25, JP/26, JP/27, JP/28, JP/29 |
| 4935 | 187 | 10 | JP/16, JP/17, JP/18, JP/19, JP/20 |
| 4937.5 | 187 | 5 | JP/25, JP/26, JP/27, JP/28, JP/29 |
| 4940 | 188 | 10 | JP/16, JP/17, JP/18, JP/19, JP/20 |
| 4940 | 188 | 20 | JP/7, JP/8, JP/9, JP/10, JP/11 |
| 4940 | 188 | 40 | JP/51, JP/52, JP/53, JP/54, JP/55 |
| 4942.5 | 1 | 5 | US/6, US/7 |
| 4942.5 | 188 | 5 | JP/25, JP/26, JP/27, JP/28, JP/29 |
| 4945 | 189 | 10 | JP/16, JP/17, JP/18, JP/19, JP/20 |
| 4945 | 11 | 10 | US/8, US/9 |
| 4947.5 | 189 | 5 | JP/25, JP/26, JP/27, JP/28, JP/29 |
| 4947.5 | 2 | 5 | US/6, US/7 |

| | | | |
|---|---|---|---|
| 4952.5 | 3 | 5 | US/6, US/7 |
| 4955 | 13 | 10 | US/8, US/9 |
| 4955 | 21 | 20 | US/10, US/11 |
| 4957.5 | 4 | 5 | US/6, US/7 |
| 4960 | 192 | 20 | JP/7, JP/8, JP/9, JP/10, JP/11 |
| 4960 | 192 | 40 | JP/46, JP/47, JP/48, JP/49, JP/50 |
| 4962.5 | 5 | 5 | US/6, US/7 |
| 4965 | 15 | 10 | US/8, US/9 |
| 4967.5 | 6 | 5 | US/6, US/7 |
| 4972.5 | 7 | 5 | US/6, US/7 |
| 4975 | 17 | 10 | US/8, US/9 |
| 4975 | 25 | 20 | US/10, US/11 |
| 4977.5 | 8 | 5 | US/6, US/7 |
| 4980 | 196 | 20 | JP/7, JP/8, JP/9, JP/10, JP/11 |
| 4980 | 196 | 40 | JP/51, JP/52, JP/53, JP/54, JP/55 |
| 4982.5 | 9 | 5 | US/6, US/7 |
| 4985 | 19 | 10 | US/8, US/9 |
| 4987.5 | 10 | 5 | US/6, US/7 |
| 5032.5 | 6 | 5 | JP/21, JP/22, JP/23, JP/24 |
| 5035 | 7 | 10 | JP/12, JP/13, JP/14, JP/15 |
| 5037.5 | 7 | 5 | JP/21, JP/22, JP/23, JP/24 |
| 5040 | 8 | 10 | JP/12, JP/13, JP/14, JP/15 |
| 5040 | 8 | 20 | JP/2, JP/3, JP/4, JP/5, JP/6 |
| 5042.5 | 8 | 5 | JP/21, JP/22, JP/23, JP/24 |
| 5045 | 9 | 10 | JP/12, JP/13, JP/14, JP/15 |
| 5047.5 | 9 | 5 | JP/21, JP/22, JP/23, JP/24 |
| 5052.5 | 10 | 5 | JP/21, JP/22, JP/23, JP/24 |
| 5055 | 11 | 10 | JP/12, JP/13, JP/14, JP/15 |
| 5057.5 | 11 | 5 | JP/21, JP/22, JP/23, JP/24 |
| 5060 | 12 | 20 | JP/2, JP/3, JP/4, JP/5, JP/6 |
| 5080 | 16 | 20 | JP/2, JP/3, JP/4, JP/5, JP/6 |
| 5170 | 34 | 20 | ~~JP/1~~ *(replaced with ch 36 in 11n)* |
| 5180 | 36 | 20 | US/1, EU/1, JP/1 |
| 5180 | 36 | 40 | US/22, EU/5, JP/36 |

| | | | |
|---|---|---|---|
| 5190 | 38 | 20 | ~~JP/1~~ *(replaced with ch 40 in 11n)* |
| 5200 | 40 | 20 | US/1, EU/1, JP/1 |
| 5200 | 40 | 40 | US/27, EU/8, JP/41 |
| 5210 | 42 | 20 | ~~JP/1~~ *(replaced with ch 44 in 11n)* |
| 5220 | 44 | 20 | US/1, EU/1, JP/1 |
| 5220 | 44 | 40 | US/22, EU/5, JP/36 |
| 5230 | 46 | 20 | ~~JP/1~~ *(replaced with ch 48 in 11n)* |
| 5240 | 48 | 20 | US/1, EU/1, JP/1 |
| 5240 | 48 | 40 | US/27, EU/8, JP/41 |
| 5260 | 52 | 20 | US/2, EU/2, JP/32, JP/33 |
| 5260 | 52 | 40 | US/23, EU/6, JP/37, JP/38 |
| 5280 | 56 | 20 | US/2, EU/2, JP/32, JP/33 |
| 5280 | 56 | 40 | US/28, EU/9, JP/42, JP/43 |
| 5300 | 60 | 20 | US/2, EU/2, JP/32, JP/33 |
| 5300 | 60 | 40 | US/23, EU/6, JP/37, JP/38 |
| 5320 | 64 | 20 | US/2, EU/2, JP/32, JP/33 |
| 5320 | 64 | 40 | US/28, EU/9, JP/42, JP/43 |
| 5500 | 100 | 10 | EU/16 |
| 5500 | 100 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5500 | 100 | 40 | US/24, EU/7, JP/39, JP/40 |
| 5510 | 102 | 10 | EU/16 |
| 5520 | 104 | 10 | EU/16 |
| 5520 | 104 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5520 | 104 | 40 | US/29, EU/10, JP/44, JP/45 |
| 5530 | 106 | 10 | EU/16 |
| 5540 | 108 | 10 | EU/16 |
| 5540 | 108 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5540 | 108 | 40 | US/24, EU/7, JP/39, JP/40 |
| 5550 | 110 | 10 | EU/16 |
| 5560 | 112 | 10 | EU/16 |
| 5560 | 112 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5560 | 112 | 40 | US/29, EU/10, JP/44, JP/45 |
| 5570 | 114 | 10 | EU/16 |
| 5580 | 116 | 10 | EU/16 |

| | | | |
|---|---|---|---|
| 5580 | 116 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5580 | 116 | 40 | US/24, EU/7, JP/39, JP/40 |
| 5590 | 118 | 10 | EU/16 |
| 5600 | 120 | 10 | EU/16 |
| 5600 | 120 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5600 | 120 | 40 | US/29, EU/10, JP/44, JP/45 |
| 5610 | 122 | 10 | EU/16 |
| 5620 | 124 | 10 | EU/16 |
| 5620 | 124 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5620 | 124 | 40 | US/24, EU/7, JP/39, JP/40 |
| 5630 | 126 | 10 | EU/16 |
| 5640 | 128 | 10 | EU/16 |
| 5640 | 128 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5640 | 128 | 40 | US/29, EU/10, JP/44, JP/45 |
| 5650 | 130 | 10 | EU/16 |
| 5660 | 132 | 10 | EU/16 |
| 5660 | 132 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5660 | 132 | 40 | US/24, EU/7, JP/39, JP/40 |
| 5670 | 134 | 10 | EU/16 |
| 5680 | 136 | 10 | EU/16 |
| 5680 | 136 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5680 | 136 | 40 | US/29, EU/10, JP/44, JP/45 |
| 5690 | 138 | 10 | EU/16 |
| 5700 | 140 | 10 | EU/16 |
| 5700 | 140 | 20 | US/4, EU/3, EU/17, JP/34, JP/35 |
| 5745 | 149 | 20 | US/3, US/5 |
| 5745 | 149 | 40 | US/25, US/26 |
| 5765 | 153 | 20 | US/3, US/5 |
| 5765 | 153 | 40 | US/30, US/31 |
| 5785 | 157 | 20 | US/3, US/5 |
| 5785 | 157 | 40 | US/25, US/26 |
| 5805 | 161 | 20 | US/3, US/5 |
| 5805 | 161 | 40 | US/30, US/31 |
| 5825 | 165 | 20 | US/5 |

| | | | |
|---|---|---|---|
| 5852.5 | 170 | 5 | US/16, EU/13 |
| 5855 | 171 | 10 | US/17 |
| 5857.5 | 171 | 5 | US/16, EU/13 |
| 5860 | 172 | 10 | US/17, EU/14 |
| 5860 | 172 | 20 | US/18, EU/15 |
| 5862.5 | 172 | 5 | US/16, EU/13 |
| 5865 | 173 | 10 | US/17 |
| 5865 | 173 | 20 | US/18, EU/15 |
| 5867.5 | 173 | 5 | US/16, EU/13 |
| 5870 | 174 | 10 | US/17, EU/14 |
| 5870 | 174 | 20 | US/18, EU/15 |
| 5872.5 | 174 | 5 | US/16, EU/13 |
| 5875 | 175 | 10 | US/17 |
| 5875 | 175 | 20 | US/18, EU/15 |
| 5877.5 | 175 | 5 | US/16, EU/13 |
| 5880 | 176 | 10 | US/17, EU/14 |
| 5880 | 176 | 20 | US/18, EU/15 |
| 5882.5 | 176 | 5 | US/16, EU/13 |
| 5885 | 177 | 10 | US/17 |
| 5885 | 177 | 20 | US/18, EU/15 |
| 5887.5 | 177 | 5 | US/16, EU/13 |
| 5890 | 178 | 10 | US/17, EU/14 |
| 5890 | 178 | 20 | US/18, EU/15 |
| 5892.5 | 178 | 5 | US/16, EU/13 |
| 5895 | 179 | 10 | US/17 |
| 5895 | 179 | 20 | US/18, EU/15 |
| 5897.5 | 179 | 5 | US/16, EU/13 |
| 5900 | 180 | 10 | US/17, EU/14 |
| 5900 | 180 | 20 | US/18, EU/15 |
| 5902.5 | 180 | 5 | US/16, EU/13 |
| 5905 | 181 | 10 | US/17 |
| 5905 | 181 | 20 | US/18, EU/15 |
| 5907.5 | 181 | 5 | US/16, EU/13 |
| 5910 | 182 | 10 | US/17, EU/14 |

| | | | |
|---|---|---|---|
| 5910 | 182 | 20 | US/18, EU/15 |
| 5912.5 | 182 | 5 | US/16, EU/13 |
| 5915 | 183 | 10 | US/17 |
| 5915 | 183 | 20 | US/18, EU/15 |
| 5917.5 | 183 | 5 | US/16, EU/13 |
| 5920 | 184 | 10 | US/17, EU/14 |
| 5922.5 | 184 | 5 | US/16, EU/13 |

- information element order

This table (compiled by Jouni) documents in which order IEs are added to association and reassociation request frames, and where they originate in the Linux implementation.

| **Kernel/User** | **order (assoc req)** | **order (reassoc req)** | **IE number** | **name [amendment]** |
|---|---|---|---|---|
| K | 3 | 4 | 0 | SSID |
| K | 4 | 5 | 1 | Supp Rates |
| K | 5 | 6 | 50 | Ext Supp Rates |
| K | 6 | 7 | 33 | Power Capab |
| K | 7 | 8 | 36 | Supp Chan |
| U | 8 | 9 | 48 | RSN |
| K | 9 | 10 | 46 | QoS Capab |
| K | 10 | 11 | 70 | RRM Enabled Capab [11k] |
| U | 11 | 12 | 54 | mobility domain [11r] |
| U | - | 13 | 55 | ftie [11r] |
| U | - | 14 | 57 | ric(multiple IEs; can include vendor IEs) [11r] |
| K | 12 | 15 | 59 | supp reg classes [11y] |
| K | 13 | 16 | 45 | HT Capab [11n] |
| K | 14 | 17 | 72 | 20/40 BSS Coex [11n] |
| K | 15 | 18 | 127 | Extended Capab [11n] |
| K | 16 | 19 | ? | QoS Traffic Capab [11v] |
| K | 17 | 20 | ? | TIM Broadcast Req [11v] |

| | | | | |
|---|---|---|---|---|
| K+U | last | last | 221 | vendor-specific |

## Driver APIs

Here are all the driver APIs we use to write drivers in Linux:

- Wireless-Extensions - old wireless driver framework
- mac80211 - wireless driver API for SoftMAC devices
- cfg80211 - new driver configuration API
- nl80211 - new userspace <–> kernelspace wireless driver communication transport
- Hardware Specifications - specifications for chipsets we support or will support soon
- Radiotap - For 802.11 frame injection/reception
- Support for Android - if you want to know how to add support for Android
- Howto modularize code - Examples of how we expect you to modularize code

## Wireless-Extensions - old wireless driver framework

### About Wireless-Extensions

Wireless-Extensions (WE or Wext) are the extensions added to the kernel circa 1997 by Jean Tourrilhes. We don't document WE as Jean already has documentation for this on his page so what we do do here is document things you should know about WE if you didn't before.

**Contents**


1. About Wireless-Extensions
2. Is WE being further developed ?
3. Why we are abandoning WE
4. What is Wireless-Extensions' replacement
5. Isn't this just changing the transport ?
6. Do we still use WE ?


### Is WE being further developed ?

No it is not. Only bug fixes are being accepted for WE.

### Why we are abandoning WE

WEs are based on ioctl() and although ioctl() has been used and still is being used as a standard transport for communication between user <–> kernelspace new transports are being preferred for several reasons.

From Linux Device Drivers - 3rd Edition:

- *In user space, the ioctl system call has the following prototype:*

```
int ioctl(int fd, unsigned long cmd, ...);
```

- *The prototype stands out in the list of Unix system calls because of the dots, which usually mark the function as having a variable number of arguments. In a real system, however, a system call can't actually have a variable number of arguments. System calls must have a well-defined prototype, because user programs can access them only through hardware "gates." Therefore, the dots in the prototype represent not a variable number of arguments but a single optional argument, traditionally identified as char *argp. The dots are simply there to prevent type checking during compilation.*

It also states:

- *The unstructured nature of the ioctl call has caused it to fall out of favor among kernel developers. Each ioctl command is, essentially, a separate, usually undocumented system call, and there is no way to audit these calls in any sort of comprehensive manner. It is also difficult to make the unstructured ioctl arguments work identically on all systems; for example, consider 64-bit systems with a userspace process running in 32-bit mode.*

### What is Wireless-Extensions' replacement

New development should be focused on cfg80211 and nl80211.

### Isn't this just changing the transport ?

No. nl80211 is a complete re-design of how wireless settings work and more clearly defines the semantics of each command (group).

### Do we still use WE ?

Yes cfg80211 and nl80211 are still being worked on so WEs are still being used.
All mac80211 drivers support WEs as mac80211 uses it. The idea is to slowly start moving things onto cfg80211 and nl80211which are not there yet and add any new features to them as well.

mac80211 - wireless driver API for SoftMAC devices

**Contents**


1. About mac80211
2. Supported features
3. The mac80211 book
4. mac80211 driver API
5. mac80211 drivers
6. mac80211 802.11d support
7. mac80211 rate control algorithms
8. The master device wmaster0
9. 802.11n and WEP or TKIP
10. other documentation
11. mac80211 files and kernel docs


## About mac80211

mac80211 is a framework which driver developers can use to write drivers for SoftMAC wireless devices.

SoftMAC devices allow for a finer control of the hardware, allowing for 802.11 frame management to be done in software for them, for both parsing and generation of 802.11 wireless frames. Most 802.11 devices today tend to be of this type, FullMAC devices have become scarce.

mac80211 implements the cfg80211 callbacks for SoftMAC devices, mac80211 then depends on cfg80211 for both registration to the networking subsystem and for configuration. Configuration is handled by cfg80211 both through nl80211 and wireless extensions.

In mac80211 the MLME is done in the kernel for station mode (STA) and in userspace for AP mode (hostapd).

If you have new userspace utilities which support nl80211 you do not need wireless-extensions to support a mac80211 device.

## Supported features

Here is a quick review of the features supported in mac80211.

- IEEE 802.11abgn
- IEEE 802.11d

- Integration of work for the emerging 802.11s standard
- Roaming using wpa_supplicant (802.11r as well). See Roaming TODO section for more details
- Different types of interfaces, see supported wireless modes for details.
- Vendor specific rate support
- QoS
- all mac80211 drivers get monitor mode support

### The mac80211 book

We are working on a set of documentation books, including one for mac80211, which are generated from comments in the various source files. You will find a more thorough review of mac80211 in the mac80211 book; the wiki pages can be used as a quick reference for mac80211 development. The book incorporates the kernel-doc docs below.

### mac80211 driver API

The new mac80211 driver interface semantics gives an overview of the expected and suggested driver behavior.

The API page lists notes about using the driver API.

The tracing page has notes on how to trace what mac80211 is asking the driver to do.

Sequence diagrams:

- auth/assoc/deauth diagram
- HW scan diagram

### mac80211 drivers

mac80211 drivers are listed on the drivers table

### mac80211 802.11d support

mac80211 supports 802.11d by processing country information element on beacons after association with an AP. You should still be able to associate to the AP in your region as cfg80211 allows users to set the regulatory domain from userspace before country information elements are parsed, this is expected to be set via wpa_supplicant upon initialization. We let cfg80211 parse the country information element for us and deal with reviewing regulatory enforcement for us. To review that please see cfg80211's regulatory support.

### mac80211 rate control algorithms

Here is a list of current mac80211 rate control algorithms:

- PID - PID (proportional-integral-derivative) rate control algorithm
- minstrel - a rate control algorithm making use of multi-rate retries

### The master device wmaster0

**⚠ This information is no longer relevant as – since kernel version 2.6.32 – the master interface is no longer created.**

mac80211 creates *one master device* and as many other *secondary devices* as requested to represent interfaces for the wireless card you have. mac80211 asks for the master device to appear as named as*wmaster%d*, and *wlan%0* for the interfaces. `udev` may override the naming convention used though. wmaster%d is an internal master device used only by mac80211. It is currently visible only because it uses netdevice structure which we must allocate and use for QoS. It also serves as a holder for all interfaces we have, and represent the underlying hardware. For example, when TXing your wlan0 STA interface will actually add IEEE-802.11 header data to a frame with just Ethernet headers, and then pass it down to the master device for actual transmission using the low level drivers.

The wlan%d devices (interfaces) are the devices you would use to configure your wireless settings.

### 802.11n and WEP or TKIP

IEEE 802.11n does not allow TKIP/WEP as pairwise ciphers in HT mode. If any of these ciphers are found to be used by the AP when a STA tries to associate to it:

```
WLAN_CIPHER_SUITE_WEP40
WLAN_CIPHER_SUITE_TKIP
WLAN_CIPHER_SUITE_WEP104
```

then 802.11n will be disabled and the STA will fall back to legacy mode of operation: 802.11a/b/g.

### other documentation

- Johannes Berg's presentation.

### mac80211 files and kernel docs

There are more files, these have kerneldocs available. The rest of the files are in net/mac80211/.

| File location / kerneldoc (kernel-doc warnings) | Branch | Branch |
|---|---|---|
| include/net/mac80211.h (W) | master | everything |

| | | |
|---|---|---|
| net/mac80211/ieee80211.c (W) | master | everything |
| net/mac80211/ieee80211_i.h (W) | master | everything |
| net/mac80211/rc80211_pid.h (W) | master | everything |
| net/mac80211/sta_info.c (W) | master | everything |
| net/mac80211/sta_info.h (W) | master | everything |
| net/mac80211/tx.c (W) | master | everything |

cfg80211 - new driver configuration API

**Contents**


1. About cfg80211
2. Writing cfg80211 drivers
3. Regulatory
4. other documentation
5. cfg80211 files and kernel docs


## About cfg80211

cfg80211 is the Linux 802.11 configuration API. cfg80211 replaces Wireless-Extensions. nl80211 is used to configure a cfg80211 device and is used for kernel <–> userspace communication. Wireless extensions is now in maintenance mode, no new features will be added to it, we'll only fix bugs for it. cfg80211 is now feature-par complete with wireless-extensions, it actually has a lot more features that are simply not available and will never be available through wireless extensions. When implementing a cfg80211 driver wireless extensions support is still provided automatically for you through cfg80211 through CONFIG_CFG80211_WEXT. Distributions no longer needing wireless extensions can remove this and are encouraged to do so. cfg80211 also provides full regulatory support, this is done through wireless-regdb and the usage of CRDA.

All new Linux wireless drivers should be written targeting either cfg80211 for fullmac devices or mac80211 for softmac devices.

## Writing cfg80211 drivers

We now have a few cfg80211 drivers, a good example of a full cfg80211 drivers is the Atheros ath6kl driver. Instead of writing wext ioctls you now write cfg80211 operation callbacks and fill in the wiphy struct to indicate to cfg80211 its device capabilities.

As an example here is ath6kl's cfg80211_ops:

```
static struct cfg80211_ops ath6kl_cfg80211_ops = {
        .add_virtual_intf = ath6kl_cfg80211_add_iface,
        .del_virtual_intf = ath6kl_cfg80211_del_iface,
```

```
        .change_virtual_intf = ath6kl_cfg80211_change_iface,
        .scan = ath6kl_cfg80211_scan,
        .connect = ath6kl_cfg80211_connect,
        .disconnect = ath6kl_cfg80211_disconnect,
        .add_key = ath6kl_cfg80211_add_key,
        .get_key = ath6kl_cfg80211_get_key,
        .del_key = ath6kl_cfg80211_del_key,
        .set_default_key = ath6kl_cfg80211_set_default_key,
        .set_wiphy_params = ath6kl_cfg80211_set_wiphy_params,
        .set_tx_power = ath6kl_cfg80211_set_txpower,
        .get_tx_power = ath6kl_cfg80211_get_txpower,
        .set_power_mgmt = ath6kl_cfg80211_set_power_mgmt,
        .join_ibss = ath6kl_cfg80211_join_ibss,
        .leave_ibss = ath6kl_cfg80211_leave_ibss,
        .get_station = ath6kl_get_station,
        .set_pmksa = ath6kl_set_pmksa,
        .del_pmksa = ath6kl_del_pmksa,
        .flush_pmksa = ath6kl_flush_pmksa,
        CFG80211_TESTMODE_CMD(ath6kl_tm_cmd)
#ifdef CONFIG_PM
        .suspend = __ath6kl_cfg80211_suspend,
        .resume = __ath6kl_cfg80211_resume,
#endif
        .start_ap = ath6kl_start_ap,
        .change_beacon = ath6kl_change_beacon,
        .stop_ap = ath6kl_stop_ap,
        .del_station = ath6kl_del_station,
        .change_station = ath6kl_change_station,
        .remain_on_channel = ath6kl_remain_on_channel,
        .cancel_remain_on_channel = ath6kl_cancel_remain_on_channel,
        .mgmt_tx = ath6kl_mgmt_tx,
        .mgmt_frame_register = ath6kl_mgmt_frame_register,
        .sched_scan_start = ath6kl_cfg80211_sscan_start,
        .sched_scan_stop = ath6kl_cfg80211_sscan_stop,
};
```

Then you allocate the wiphy by specifying the cfg80211 ops and fill the wiphy.

For more details refer to cfg80211.h and as an example driver you can read ath6kl.

### Regulatory

Linux wireless regulatory documentation:

- Addressing vendor concerns
- Regulatory statement by developer on responsibility
- Linux wireless regulatory documentation
- Regulatory processing rule documentation

- CRDA documentation

### other documentation

- Johannes Berg's presentation (out of date!)

### cfg80211 files and kernel docs

- include/net/cfg80211.h (kerneldoc)
- cfg80211 kerneldoc warnings

nl80211 - new userspace <–> kernelspace wireless driver communication transport

## Contents


1. About nl80211
2. Users of nl80211
3. libnl tiny
4. Kerneldoc for nl80211


### About nl80211

nl80211 is the new 802.11 netlink interface public header. Together with cfg80211 it is intended to replace Wireless-Extensions. nl80211 and cfg80211 are still under development.

### Users of nl80211

Current users of nl80211:

- iw
- crda
- hostapd
- wpa_supplicant (with **-Dnl80211**)

### libnl tiny

OpenWrt folks created a tiny version of libnl based on a git snapshot, which only contains genl, not rtnetlink or any of the netfilter stuff, and compiles down to less than 30k in binary size. You can find it here:

https://dev.openwrt.org/browser/trunk/package/libs/libnl-tiny

https://dev.openwrt.org/browser/trunk/package/libnl-tiny

### Kerneldoc for nl80211

- include/linux/nl80211.h (kerneldoc)
- nl80211 kerneldoc warnings

Hardware Specifications - specifications for chipsets we support or will support soon

## Contents


1. About specifications
2. Broadcom hardware specifications
3. Atheros specifications
    1. Atheros Legacy-HAL
    2. Sam Leffler's HAL
    3. Further documentation
4. Airgo hardware
5. Ralink documentation
6. STMicroelectronics hardware
7. Texas Instruments hardware specifications


### About specifications

This page contains a list of specifications used to write Linux drivers for several wireless cards, and which, alternatively, can be used to write drivers for any other platforms.

### Broadcom hardware specifications

The b43 driver was written based on the reverse engineered specification. This device currently is known to use two different firmware types, each of which changes the behavior of the driver. Because of this we have two different drivers for each handle each firmware. Fortunately we have specifications written for both firmwares.

- Specifications for v3 firmware
- Specifications for V4 firmware

### Atheros specifications

#### Atheros Legacy-HAL

Atheros has released their legacy under the ISC license

- Atheros legacy HAL for their 802.11abg chipsets

### Sam Leffler's HAL

Atheros has worked with Sam Leffler to allow him to release his HAL. You can get it through svn:

```
svn co http://svn.freebsd.org/base/projects/ath_hal
```

### Further documentation

Atheros engage further with **active** upstream developers.

### Airgo hardware

This is new and ongoing project.

- Airgo specifications

### Ralink documentation

Ralink has provided EEPROM channel documentation on two of their chipsets.

- RT61 EEPROM Channels
- RT2460 EEPROM Channels
- RT2560 EEPROM Channels
- RT2571 EEPROM Channels
- RT2860 EEPROM Channels

### STMicroelectronics hardware

This is a p54 variant used in some mobile devices.

- lmac_longbow.h
- STSW45x0C_LMAC_API_ED1P4.pdf

### Texas Instruments hardware specifications

WL1271 is used in some mobile devices and on the PandaBoard. Following documentation provides hardware related information for mac80211 developers and hardware developers who wish to use the device in their designs

- WL1271 datasheet
- OMAP35x wireless solution hardware specifications
- Module information

Radiotap - For 802.11 frame injection/reception

**Contents**


1. About Radiotap
2. Linux support
3. mac80211 support for radiotap


## About Radiotap

Radiotap is a de facto standard for 802.11 frame injection and reception. Details of radiotap can be found on its new website.

http://www.radiotap.org/

## Linux support

Linux has started to embrace radiotap on its drivers and driver APIs. Relevant files:

XXX: move ieee80211_radiotap.h to kerneldoc

- include/net/ieee80211_radiotap.h - Our definitions for its support
- include/net/cfg80211.h (kerneldoc)- iterator support for possible radiotap arguments
- include/net/mac80211.h (kerneldoc) - mac80211 support for radiotap

## mac80211 support for radiotap

mac80211 supports receiving radiotap headers before the actual 802.11 frame. The driver informs mac80211 when it adds a radiotap header by enabling the *RX_FLAG_RADIOTAP* flag on *flag* member of*struct ieee80211_rx_status*. When a driver is done with a frame it passes it to mac80211 via *ieee80211_rx*.

mac80211 informs drivers it wants radiotap headers in its received skbs during *ieee80211_open()*, the device's open routine (dev->open). It does this when the type of interface being opened is of type*NL80211_IFTYPE_MONITIR*, a monitor interface. It informs the driver by enabling IEEE80211_CONF_RADIOTAP on *struct ieee80211_hw*s *struct ieee80211_conf flags* Sequentially, mac80211 will disable this flag during *ieee80211_stop()* (dev->stop) for *NL80211_IFTYPE_MONITOR*interface types.

Support for Android - if you want to know how to add support for Android

## Support for cfg80211 / mac80211 Linux 802.11 drivers on Android

This section tries to document what is required to support 802.11 Linux drivers on Android.

**Contents**


1. Support for cfg80211 / mac80211 Linux 802.11 drivers on Android
2. The current status quo
3. Roadmap
4. Work
5. LKML References


### The current status quo

Android uses wireless-extensions to support its 802.11 drivers. The drivers that Android devices have up to this day used are all using wireless-extensions for communication. The Android codebase also uses a custom wpa_supplicant. The details of this can be found on android's porting wifi page and on this porting wifi drivers to android documentation.

### Roadmap

The current Android 802.11 interface should change to use nl80211. The proper approach would be to extend nl80211 upstream (where necessary) and use an unmodified wpa_supplicant in Android.

Doing this will mean adding support to Android for *all* new 802.11 cfg80211/mac80211 Linux drivers.

### Work

Anyone working on this?

### LKML References

- Android for mac80211 / cfg80211 802.11 nag v1

- Android PM enhancements

Howto modularize code - Examples of how we expect you to modularize code

## Modularizing code

This section is dedicated to teaching developers how to modularize code in an acceptable way upstream for Linux wireless. You will modularize code in drivers for configurable options, or in mac80211 and cfg80211 when you want an option to be available as a configurable option. Whether or not you have the feature available as modular or not can depend on the stability, size, or use overall general usage case of the code in question.

The Linux kernel allows us to specify build time options using the .config configuration file. The .config file is generated once a user configures a kernel. The kernel can be configured through several user interface mechanisms but all parse existing kernel configuration options stored in Kconfig files. Kernel configuration file writing can be an art in itself but for simple additions to the kernel it is easy enough to just read existing Kconfig files.

Given that Kconfig files allow us to define the kernel configuration options to modularize the kernel we then need to rely on Kconfig for addition of new build time options. When building the kernel we can either piggy back object data to be linked into the final vmlinux kernel or to a specific module. When objects are specified to be part of the final kernel image they get linked into their respective directory's built-in.o object. Each directory's built-in.o object eventually gets linked together to build the final kernel image. A module gets its own set of defined objects linked together to build it.

One can then modularize the kernel with Kconfig options.

### Contents


1. Modularizing code
2. Modularizing only once
3. Modularizing Mesh for mac80211
4. When do you modularize


## Modularizing only once

Some build systems, typically proprietary driver build systems, allows for defining a configuration option under a slew of different names. Fortunately, the Linux kernel does not do this. If you want to enable a kernel configuration option you do this once and through the kernel's configuration build system. For instance, you can only set CONFIG_ATH9K=m by enabling the ath9k module when configuring the Linux kernel. Although this is true for

CONFIG_ATH9K the CONFIG_ATH9K_HW however can be selected for you when you either want the ath9k driver or the ath9k_htc driver, both of which make use of the objects defined under CONFIG_ATH9K_HW. This dependency map, however, is hidden from the user and the dependency map then is kept track of by the kernel's configuration build system. The final decisions of the entire kernel configuration is stored in one file, .config and its respective defines are stored in the include/generated/autoconf.h upon build time.

### Modularizing Mesh for mac80211

Lets start off with one example and reasons for why a feature is a configurable option for mac80211. The 802.11s support for mac80211 is defined as a build time kernel configuration option. This is found in the*net/mac80211/Makefile* as follows:

```
mac80211-$(CONFIG_MAC80211_MESH) += \
        mesh.o \
        mesh_pathtbl.o \
        mesh_plink.o \
        mesh_hwmp.o
```

At build time then we will only link to mac80211 the respective mesh build objects if and only if CONFIG_MAC80211_MESH has been set when configuring the kernel. Now, you will see a lot of #ifdef CONFIG_MAC80211_MESH conditions on a lot of mac80211 C files sprinkled in between routines. This behavior *should* be avoided to help with code legibility. The more ifdefs we have sprinkled in a C routine the less legible the code becomes. Instead modularized code should have routines in place for the ifdef code which allows the routine to do nothing when the option is not enabled on the kernel configuration. An example would be to have a foo.h file:

```
struct stuff {
   int counter;
};

#ifdef CONFIG_FOO
static int foo_increment(struct stuff *c);
#else /* CONFIG_FOO */
static inline static int foo_increment(struct stuff *c)
{
  return 0;
}
#endif
```

Then the foo.c file can be a build time option:

```
obj-$(CONFIG_FOO) += foo.o
```

And foo.c can contain:

```
#include "foo.h"
```

```
static int foo_increment(struct stuff *c)
{
   c->counter++;
   if (c->counter > 1000)
     return -1;
   return 0;
}
```

With this then code that has CONFIG_FOO() disabled can simply use foo_increment() without any harm to either the eye by placing unnecessary ifdefs or to runtime code.

### When do you modularize

You may modularize if the code in question may be a feature not desirable for all builds. For mesh this is the case as Mesh is still a draft through Draft 802.11s. Mesh code also has quite a bit of code which embedded Linux distributions can shave off by removing it. You **do not** want to modularize firmware API, so if you have a device which accepts certain number of commands you do not want to have a build time option for reducing or increasing the number of commands available for the firmware. For example, you do not want to do something like this:

```
enum WMI_CMD {
    CMD_RX,
    CMD_TX,
#ifdef CONFIG_WMI_EXT
    CMD_PRIVATE_GET_MAGIC
#endif
};
```

You want to keep the magic command and instead simply return -EOPNOTSUPP when the command is issued.

# 802.11 Development process

Check out the 802.11 development process page for details of how patches get merged into Linux for 802.11 and what trees are used.

## Developer process

This section documents the development process for 802.11 and the trees used.

**Contents**


1. Developer process
2. Patch review process
3. Maintainer chain
4. The Linux kernel maintainer - Linus Torvalds
5. The linux-next integration testing tree maintainer - Stephen Rothwell
6. The Networking subsystem maintainer - David S. Miller
7. The 802.11 subsystem maintainer - John W. Linville
    1. wireless-testing.git
    2. wireless-next-2.6.git
    3. wireless-2.6.git
8. The mac80211 and cfg80211 maintainer - Johannes Berg
9. The compat-wireless maintainer - Luis R. Rodriguez
10. The 802.11 driver maintainers
11. Other documentation/presentations

## Patch review process

Patches for the 802.11 subsystem must be sent to John and posted to the linux-wireless mailing list. For details of the patch format review the patch submission guide for 802.11 and our git guide. Once posted the patches will go through a review process by the community. Anyone can post comments regarding your patch, you should try to be responsive and address any questions asked.

Your e-mails and replies to e-mails should use bottom posting style for replies. HTML e-mails are rejected by the linux-wireless mailing list so be sure to use plain text.

The review process completes once no one has posted concerns, questions or comments, or explicitly has ACKed the patch. John will usually merge the patch the week the review process completes.

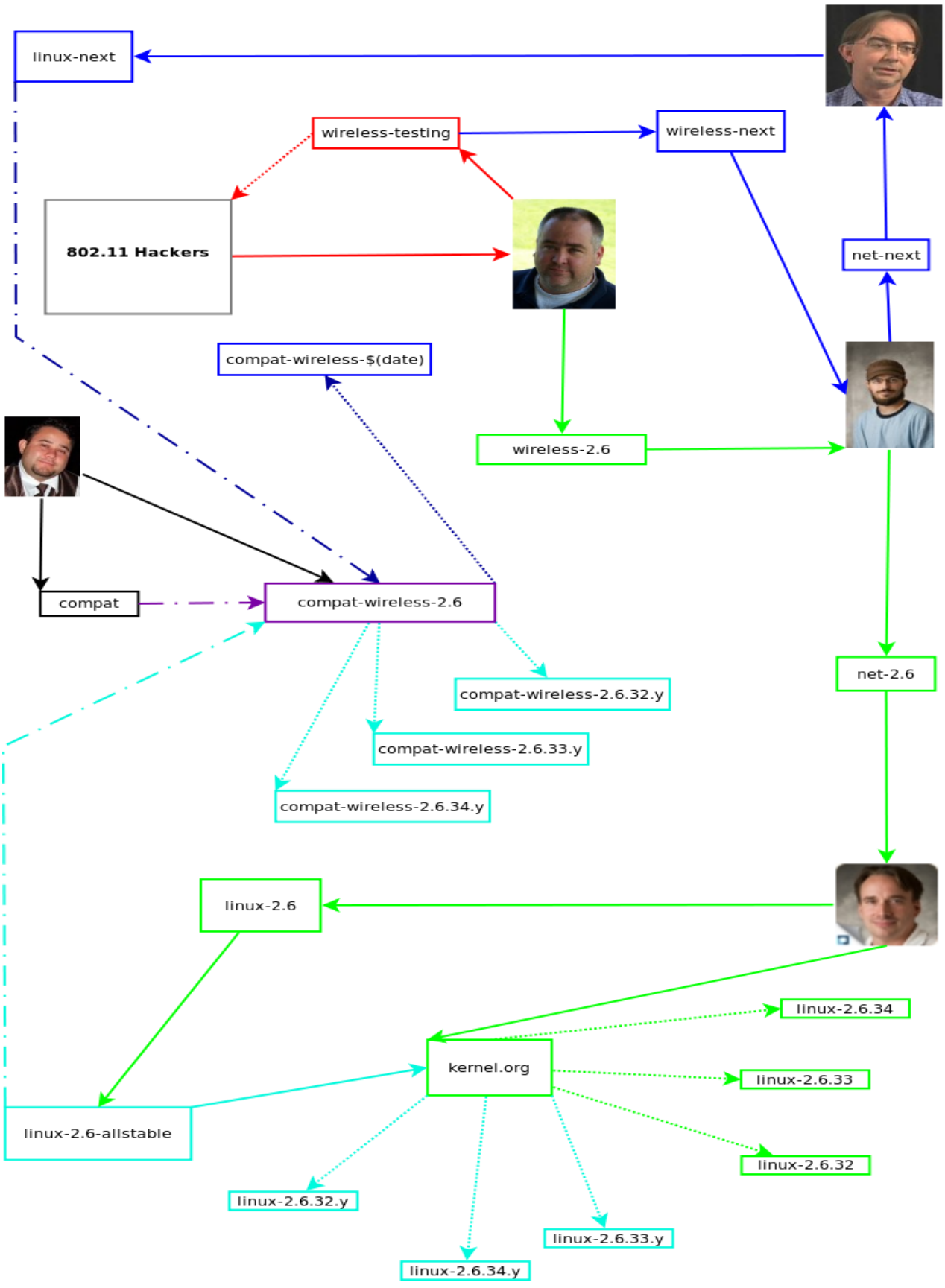
## Maintainer chain

802.11 development follows the usual Linux kernel development style and has one maintainer assigned to the entire subsystem. Apart from that we also have specific component maintainers for each major component part of the 802.11 subsystem and we also have specific driver maintainers.

The diagram below illustrates the chain of how patches get into Linux for 802.11:

**(Note: This diagram is out of date, some arrows are just wrong, e.g. wireless-next feeds wireless-testing, not the other way**

**around)**


linux-next
wireless-testing
wireless-next
802.11 Hackers
net-next
compat-wireless-$(date)
wireless-2.6
compat
compat-wireless-2.6
compat-wireless-2.6.32.y
compat-wireless-2.6.33.y
compat-wireless-2.6.34.y
net-2.6
linux-2.6
linux-2.6.34
kernel.org
linux-2.6.33
linux-2.6-allstable
linux-2.6.32
linux-2.6.32.y
linux-2.6.33.y
linux-2.6.34.y

We detail below the maintainers an 802.11 patch usually goes through for inclusion into Linux.

### The Linux kernel maintainer - Linus Torvalds

Linus maintains the Linux kernel as a whole. He receives patches from every major subsystem, a couple relevant examples are patches from David Miller for the Networking subsystem and patches from Greg Kroah-Hartman for the USB subsystem.

Linus makes stable kernel.org releases based off of this tree:

- The linux-2.6.git tree

### The linux-next integration testing tree maintainer - Stephen Rothwell

Stephen maintains a tree to help with the testing of patches which are to be eventually sent to Linus Torvalds for the next kernel release. If kernel.org indicates the latest stable kernel is 2.6.33 it means that the patches in Stephen's linux-next.git are patches which will likely end up being sent to Linus Torvalds for inclusion into the 2.6.34 kernel release.

- linux-next.git - subsystem maintainers send their queued up patches to Stephen for integration and testing
- The linux-next FAQ

### The Networking subsystem maintainer - David S. Miller

Amongst other things David maintains the network subsystem for the Linux kernel. All networking subsystem maintainers send patch updates to David, this includes the 802.11 maintainer and the Bluetooth maintainer.

Relevant trees to 802.11 that David maintains:

- Networking net-2.6.git tree - Used to send patches to Linus for the linux-2.6.git tree
- Networking net-next-2.6.git tree - Used to send patches to Stephen for the linux-next.git tree

### The 802.11 subsystem maintainer - John W. Linville

John W. Linville is the Linux kernel 802.11 subsystem maintainer. As a maintainer he reads all patches posted to the linux-wireless mailing list, and once ready merges them into the development and stable trees.

John uses three trees for overall 802.11 maintenance:

- wireless-testing.git
- wireless-next-2.6.git
- wireless-2.6.git

The differences between these are explained below.

#### wireless-testing.git

The wireless-testing.git tree is a git tree that provides developers the chance to use a bootable kernel based on Linus' tree with all new 802.11 development patches. John merges first the

wireless-2.6.git tree into this tree, and then merges the wireless-next.git tree into it. He resolves all conflicts along the way.

The history in wireless-testing is dirty. It contains crap like reverts only so that John can continue to pull cleanly from wireless-next-2.6 and wireless-2.6 even after John has had to rebase those other trees. The reverts are done so that developers can use a linear tree, so you can simply git pull or git rebase on origin/master and continue with your development. Without these arrangements John would have to do lots of pointless fixups in a tree that will never be pulled by Linus anyway. The ugly history is the alternative to rebasing, so that those who pull or rebase on origin/master can do so without git complaining.

The point of wireless-testing is to provide something between linux-2.6 and linux-next, something that is close to the stabilising release but with currently pending wireless patches. It is not intended to be a basis for historical research. Don't use it for that.

Developers should work off of this git tree for all 802.11 development. Developers can simply pull the tree for new updates if no changes have been made committed locally. If you do have changes committed locally you can rebase your tree on top of John's by doing the following instead of pulling:

```
git fetch
git rebase origin/master
```

Detailed changes for this tree:

- Driver changes
- Wireless core changes
- mac80211 changes

### w i r e l e s s - n e x t - 2 . 6 . g i t

The wireless-next-2.6.git tree is used by John to push patches to the respective net-next-2.6.git treemaintained by David. For example if the latest stable kernel release is 2.6.33 then **Networking patches** for the next kernel release are queued in the David Miller's net-next-2.6.git tree, and in this case it would be for the 2.6.34 kernel release. John pushes patches to David by referring to his own wireless-next-2.6.git tree. Prior to sending new changes to David John pull's David's tree into his own tree and addresses any merge conflicts. David's tree would have had the last batch updates John sent to David plus any new networking changes David has picked up from anyone else. David would merge the new 802.11 wireless-next-2.6.git tree changes and at that point the net-next-2.6.git tree becomes in synch with John's queue of 802.11 changes for the next kernel release. David Miller will eventually send his own set of queued up patches to Stephen for the linux-next.git tree.

- Driver changes
- Wireless core changes
- mac80211 changes

### wireless-2.6.git

The wireless-2.6.git tree is used to pushing wireless patches to the current -rc release of the Linux kernel. For example If the latest stable kernel release is 2.6.33, John will use his wireless-2.6.git tree to send updates to 2.6.34-rc releases.

- Driver changes
- Wireless core changes
- mac80211 changes

### The mac80211 and cfg80211 maintainer - Johannes Berg

Johannes maintains the cfg80211 and the mac80211 components of the 802.11 subsystem. This means patches for either mac80211 or cfg80211 should be addressed to him and that he will pro actively review them.

### The compat-wireless maintainer - Luis R. Rodriguez

Luis maintains compat-wireless and the generic Linux kernel compatibility tree, used to provide tarballs of the 802.11 subsystem for both stable kernel releases and for bleeding edge releases based on the linux-next git tree. As of the 2.6.33 kernel release the compat-wireless tree now also provides backport for the Bluetooth subsystem as well as a few Ethernet drivers, check the compat-wireless page for more information.

### The 802.11 driver maintainers

Each driver has its own set of maintainers and patches for each driver should be sent to them as well. These driver developers will pro actively review patches posted. See the 802.11 driver maintainers page for details.

### Other documentation/presentations

- Johannes's presentation at UDS Karmic

### Stable monitor list

The stable-pending section is dedicated to the ensuring we propagate critical patches to the stable series of the Linux kernel. Use it to peg commits which you know are important to get merged.

Regulatory:

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## Implementation review

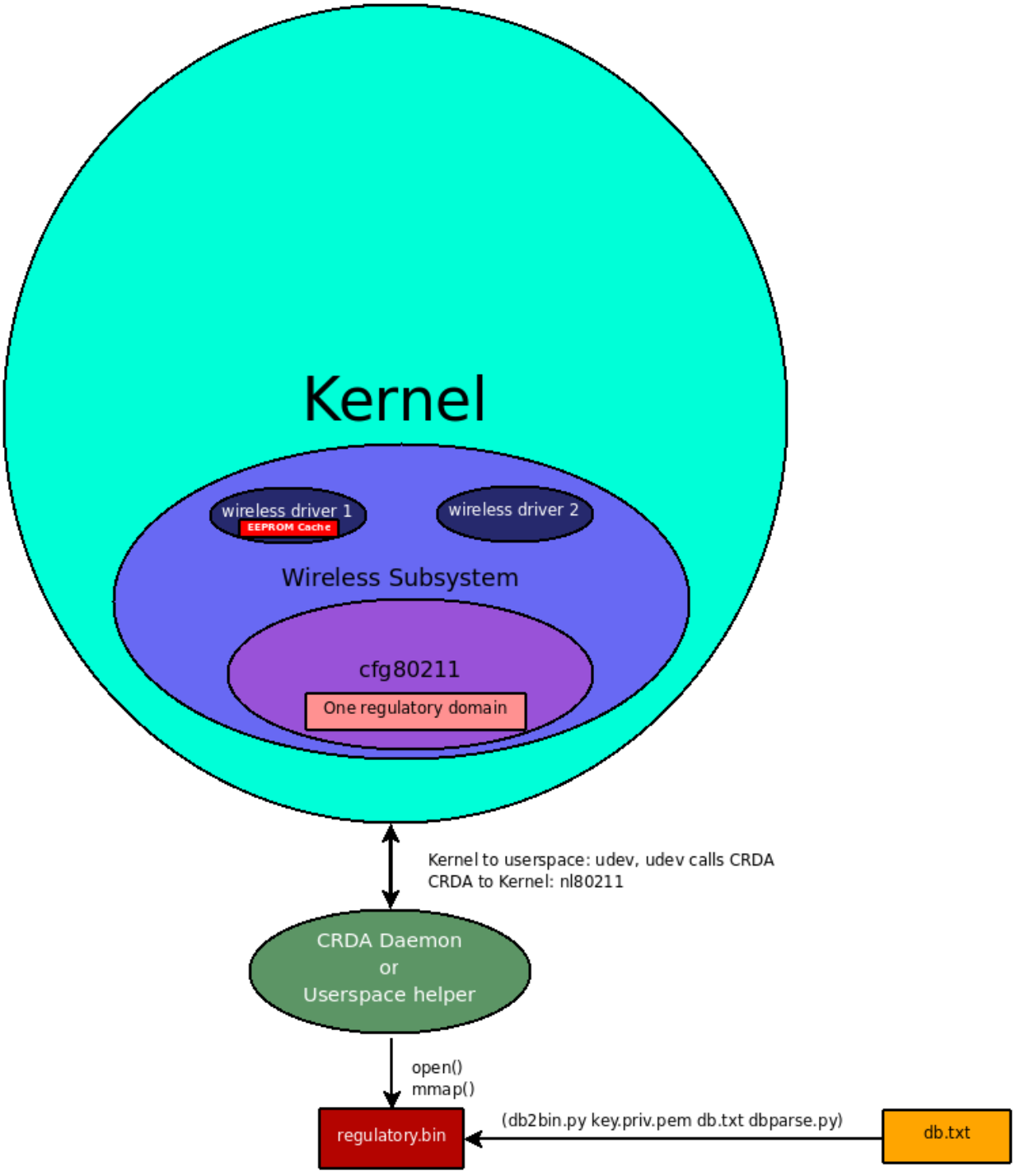
We take regulatory considerations seriously as its one of the major key components to getting proper vendor support on drivers due to fear uncertainty and doubt that Linux drivers cannot follow the requirements for radio spectrum use. For non-technical details on our position on regulatory support on Linux see our Linux wireless regulatory support statement. Despite the fact that drivers and hardware can have their own regulatory solutions we provide this framework as a safety net for regulatory considerations to account for changes and updates on regulatory rules world wide and to provide an API to allow drivers to export their own regulatory restrictions. Our regulatory infrastructure consists of three major components:

- Kernel integration
- CRDA
- The regulatory database

We embrace proper regulatory compliance in the Linux kernel by making it part of cfg80211, used by new wireless drivers. We maintain a thorough and flexible regulatory database in userspace and provide aCentral Regulatory Domain Agent (CRDA), a userspace agent, which can be triggered to update the kernel wireless core's definition of the regulatory permissions for a specific country. Keeping the database in userspace allows distributions to provide updates without kernel upgrades. The database is shipped in binary form using a binary file format designed for size efficiency that also includes a set of RSA digital signatures or can read a set of them from a preconfigured directory. When a regulatory domain change is detected (for example by observing an AP with country information), the kernel will request, from CRDA, the regulatory permissions for the new domain to enforce those on drivers.

For some hardware, regulatory permissions are programmed into the EEPROM, these can be observed as well, depending on the driver. Some drivers rely on EEPROM values for enforcement or calibration and drivers can continue to rely on these values by filtering the CRDA data according to the EEPROM settings. For these type of drivers, CRDA provides an extra layer of regulatory compliance, for instance when the card is in a laptop that roams between countries.

The diagram below illustrates best the current design of CRDA and its interaction kernel and the regulatory database.



### Status

The new regulatory infrastructure went in as of 2.6.28, so CRDA can be used in kernels >= 2.6.28. It is required for 802.11d operation in 2.6.29.

### Code releases

- wireless-regdb: http://kernel.org/pub/software/network/wireless-regdb/
- CRDA: http://wireless.kernel.org/download/crda/

### Kernel integration

We have factored common regulatory driver code as part of the wireless stack and provided a way for a userspace agent to update the currently set regulatory domain. All new drivers registered with cfg80211 can reap benefits from this through cfg80211's regulatory support. mac80211 also uses this regulatory infrastructure to support 802.11d. An important component to Linux' own kernel integration is to allow drivers themselves to hint to the wireless core an alpha2 and have a callback to review the data passed by crda based on its own driver or EEPROM data. This allows vendors to use their own regulatory information to help enhance regulatory compliance even further. For more details on the Linux kernel integration see how you can set the regulatory domain.

### CRDA

CRDA is our userspace agent which uploads regulatory domains into the kernel, it acts as a udev helper.

### The regulatory database

CRDA requires a regulatory database (Web view or gitweb) to be build and maintained. Our hope is that this database can be used by other platforms (open or proprietary), not just Linux. John Linville maintains this database through the wireless-regdb git tree:

http://git.kernel.org/?p=linux/kernel/git/linville/wireless-regdb.git

```
git://git.kernel.org/pub/scm/linux/kernel/git/linville/wireless-regdb.git
```

The regulatory.bin file there is signed with his RSA private key. We keep the RSA public key embedded as part of CRDA which allows us to verify the authorship and integrity of the regulatory database.

#### Releases of wireless-regdb

You can find official wireless-regdb releases here: http://kernel.org/pub/software/network/wireless-regdb/

### ASCII file format

Below is an example of a country entry for the db.txt regulatory file for EC (Ecuador)

```
country EC:
        (2402 - 2482 @ 40), (N/A, 20)
        (5170 - 5250 @ 20), (6, 17)
        (5250 - 5330 @ 20), (6, 23), DFS
        (5735 - 5835 @ 20), (6, 30)
```

Note that the frequency range (e.g. `2402-2482`) covers the complete used bandwidth, so this definition allows using the 2 GHz channels 1 through 13 as 40 MHz channels. 5 GHz channels of a bandwidth of 20 MHz can be used if the frequencies used by the channel fit into the specified frequency ranges.

### Binary file format

We define a new custom binary file format for use with CRDA, to have the data available quickly and as compact as possible as well as allowing to distribute the data along with the digital signature (see below) as easily as possible. The file format is defined in the regdb.h header file.

### RSA Digital Signature

Integrity of the binary regulatory file is ensured by digitally signing the regulatory data using a private key and embedding the signature into the binary file. When the file is loaded by the regulatory daemon the signature is checked against a list of public keys built into the regulatory daemon binary or by by checking against the list of public keys in a preconfigured directory. This process ensures regulatory.bin file authorship and integrity.

Both CRDA and wireless-regdb allows you to build it without RSA key signature checking, if this is something you find useless then do not use them, but we advise against it. The reason RSA digital signature checks are an option and is what is recommend is that regulatory bodies are highly sensitive towards compliance and the current infrastructure we have gives us best effort on our part of doing the best we can to ensure integrity of the files and also gives us a mechanism to use files from trusted parties on-the-fly. Distribution packaging tends to guarantee file integrity upon installation time and from a specific source but it does not give you on-the-fly file integrity checks. Integrity checks are possible through alternate means such as simple CRC checks but you'd then need a list of all allowed CRCs, by using RSA digital signatures you get both file integrity checks for _any_ binary built with the private key by checking for the signature – and while at it you also can get file authorship protection – all of this while the file is being read for usage in memory. Distributions do not protect against file corruption after the files are in place, for example.

John Linville is the default trusted party in CRDA if you enable RSA digital signature checks because he is the maintainer of the Linux wireless subsystem and wireless-regdb. CRDA lets you enable multiple trusted parties by letting you add more public keys into CRDA's source code's pubkeys directory or by adding them into a preconfigured system directory for dynamic reading at runtime.

If your distribution requires you to *build* your own regulatory.bin you can add your own public key into CRDA's source code pubkeys directory or at installation time on the system preconfigured pubkeys directory. CRDA will then run using a regulatory.bin built by John Linville or your distribution's wirelss-regdb package maintainer's key. The benefit of allowing CRDA to trust either John's key or your own distribution is it allows users to upgrade their regulatory.bin using their own distribution's built regulatory.bin, or simply upgrade to using the binary regulatory.bin provided through wireless-regdb or through releases on this web site.

### Sending updates to the regulatory database

If you find any errors please send them to the wirleess-regdb mailing list and the linux-wireless mailing list, either as patches to the db.txt file from the wireless-regdb git tree, or just tell us what is wrong in plain English.

Patches sent to the wireless-regdb git tree should be addressed as follows:

```
To: linville@tuxdriver.com
Cc: wireless-regdb@lists.infradead.org, linux-wireless@vger.kernel.org
Subject: wireless-regdb: Update regulatory rules for France (FR) on
5GHz
```

### Mailing list for regulatory updates

The goal is to make regulatory data for 802.11 Part 15 rules shared between different 802.11 devices. It may be even possible to share the same regulatory database across different operating systems. Either way since data can potentially be shared we have a mailing list dedicated to discussions and review of just regulatory information. Subscribe to it for review or updates.

http://lists.infradead.org/mailman/listinfo/wireless-regdb

Please review these instructions on details of what is expected from you to make modifications to the regulatory database file.

### Changing the database file format

To change the file format you will need to send patches to both crda (start off with regdb.h) and wireless-regdb/dbparse.py. You should send your patch as an RFC on the linux-wireless mailing list and CC both the wireless-regdb and crda maintainers.

## Old regulatory implementation

This section exists to explain how we used to do things and to also explain what**CONFIG_WIRELESS_OLD_REGULATORY** was exactly. Prior to our new regulatory

implementation explained throughout this page we had 3 static regulatory domains built-in to the Linux kernel for all cfg802111 drivers (therefore all mac80211 drivers). Apart from the 3 static regulatory domains in the old implementation we also gave users the option to set the regulatory domain via the *ieee80211_regdom*module parameter. We cover these details below.

### Old static regulatory domains

The 3 old static regulatory domains we had implemented in-kernel were for:

- US
- EU
- JP

By *static regulatory domains* we mean that they were defined in kernel-space and the only way to make changes due to regulatory updates by different countries was to send a patch for submission for inclusion into the Linux kernel. There are several downsides to this approach. We review them briefly below.

- Country regulatory changes would need to accounted for completely in kernel space, requiring regulatory updates to be backported to older kernel releases.
- Each country can have their own regulatory rules requiring an entry for each country or some conglomeration of countries into custom groups. This can lead to huge debates on implementation and efficiency – each vendor has their own set of custom regulatory domains to group regulatory information into groups, taking one vendor approach would imply preferring one implementation over another
- Only accounted for countries in each kernel release would get proper regulatory consideration

Our initial implementation approach for our new regulatory infrastructure was to populate a regulatory domain in-kernel for each country. It was decided that it is a lot easier to deal with this in userspace and so that was one of the design changes for new regulatory implementation.

### The ieee80211_regdom module parameter

Another old option for users from the old regulatory implementation was to set the regulatory domain using a module parameter for the cfg80211 module. The module parameter name is *ieee80211_regdom*. This module parameter **only** exists in 2.6.27, 2.6.28 when the **CONFIG_WIRELESS_OLD_REGULATORY**option is enabled.
The *ieee80211_regdom* module parameter has become available as of recent kernel to users without the *CONFIG_WIRELESS_OLD_REGULATORY* enabled, in those kernels it is treated as a userspace regulatory hint request but the compromise was that when using the "EU" regulatory domain the user will world roam as "EU" is not an ISO / IEC 3166 country code. Users of "EU" are encouraged to be more specific and supply their country ISO3166-alpha2 instead when not using CONFIG_WIRELESS_OLD_REGULATORY.

The *ieee80211_regdom* module parameter is inherited from our **old** regulatory implementation. We now have a userspace API which allows userspace to inform the kernel what country you are in through nl80211. Currently two userspace applications exists that supports this, iw and wpa_supplicant. Using the*ieee80211_regdom* module parameter on modern kernels is treated as a userspace regulatory hint as if it came through nl80211 through utilities like iw and wpa_supplicant.

Although modern kernels do support the *ieee80211_regdom* module parameter distributions are encouraged to use userspace utilties to supply country hints instead since in the future the Linux desktop may be providing userspace regulatory hints by default through things like geoclue (more on this below).

#### Feature removal

*CONFIG_WIRELESS_OLD_REGULATORY* has been replaced completely as of the 2.6.34 Linux kernel release and disabled by default as of 2.6.30. The alternative for those seeking in-kernel regulatory databases is to now build the *entire* regulatory database into the kernel itself, therefore not requiring a userspace agent. This is achieved with CFG80211_INTERNAL_REGDB. Users ofCFG80211_INTERNAL_REGDB should be aware though that new regulatory updates would not be possible when this mechanism is used unless a new kernel is provided for each new regulatory update, for more information see the documentation on CFG80211_INTERNAL_REGDB.

#### Automatic country discovery

The Linux desktop is expected to advance to be able to discover what country it is in at any point in time and to pass this off to the kernel to enhance regulatory compliance. To aid with these efforts we had started a Google Summer of Code (GSoC) project for 2009 to help integrate GeoClue to the GNOME desktop. This project did not coplete but for details please see the GeoClue regulatory integration GSoC project.

### Custom regulatory information

The Linux regulatory infrastructure was designed to allow compliance but to also address flexibility where a manufacturer customizes hardware or wants to sell hardware that works on a licensed band or a customized regulatory environment not covered by the usual world wide regulatory agencies. Customizations are also likely to happen in research environments where local regulatory laws may not apply depending on jurisdiction.

The regulatory infrastructure supports both authorship and file integrity, and allows third parties to distribute binary-only regulatory databases even with custom licenses as the software for it is licensed under a permissive license, the ISC license. Below we cover how to achieve all this.

#### Editing the regulatory database

You can edit the regulatory database by modifying db.txt as you see fit.

### Generating your own private and public key

You typically do not have to build the wireless-regdb, unless you want to attach a customized RSA signature based on your public key. You can generate your own public and private keys by building wireless-regdb. Below is an example of building wireless-regdb:

```
mcgrof@tux ~/devel/wireless-regdb (git::master)$ make
Generating private key for mcgrof...
openssl genrsa -out ~/.wireless-regdb-mcgrof.key.priv.pem 2048
Generating RSA private key, 2048 bit long modulus
.........................+++
.....................................................................
.............................+++
e is 65537 (0x10001)
Generating public key for mcgrof...
openssl rsa -in ~/.wireless-regdb-mcgrof.key.priv.pem -out
mcgrof.key.pub.pem -pubout -outform PEM
writing RSA key
Generating regulatory.bin digitally signed by mcgrof...
./db2bin.py regulatory.bin db.txt ~/.wireless-regdb-
mcgrof.key.priv.pem
```

On this example the build produced three files:

- ~mcgrof/.wireless-regdb-mcgrof.key.priv.pem - the RSA private key
- mcgrof.key.pub.pem - the RSA public key
- regulatory.bin - digitally signed binary regulatory database

The private key is built into your home directory by default. The public key is built into the wireless-regdb directory. The binary wireless regulatory database is then built and then digitally sign it using your private key. When you run make again only a binary regulatory database file will be built as the public and private keys would have been built already.

### Importing your public key into CRDA

CRDA has a directory, *pubkeys* of all trusted public keys it can use to embed onto the binary for RSA signature verification against any particular binary regulatory database. This is used to allow CRDA to trust different authors for regulatory information. By default John Linville's key is always present on the pubkeys directory. You can remove it if for your particular application you cannot trust the upstream community regulatory database information.

CRDA can be built with gcrypt or openssl support. If using openssl (USE_OPENSSL=1) you can enable dynamic loading of trusted public keys and stuff custom public keys at any time into the /etc/wireless-regdb/pubkeys directory (by default).

You can also import your public key to be built into the CRDA binary though. This is required for gcrypt support as gcrypt support lacks a PEM parser. To import your public key to be built into CRDA all you have to do is copy it into the pubkeys directory of crda source code prior to building CRDA:

```
mcgrof@tux ~/devel/crda (git::master)$ cp ../wireless-
regdb/mcgrof.key.pub.pem pubkeys/
```

### Building using extra public keys

To build CRDA with extra public keys built-in to the final binary CRDA just run make with the list of public keys you trust in the *pubkeys* directory. For example to build wireless-regdb with a custom mcgrof.key.pub.pem stuffed into the pubkeys directory you would do:

```
mcgrof@tux ~/devel/crda (git::master)$ make
  GEN  keys-gcrypt.c
  Trusted pubkeys: pubkeys/linville.key.pub.pem
pubkeys/mcgrof.key.pub.pem
  CC   reglib.o
  CC   crda.o
  LD   crda
  CC   intersect.o
  CC   print-regdom.o
  LD   intersect
  CC   regdbdump.o
  LD   regdbdump
  CHK  /usr/lib/crda/regulatory.bin
```

### Redistribution licenses

Since both wireless-regdb and CRDA are licensed under a permissive license, the ISC license, you can choose to modify wireless-regdb, create your own keys and redistribute only the binary regulatory.bin without providing the source code or keys.

The license is important. You are free to redistribute your binary and public key under a new license, even a proprietary one, but you must still keep the original copyright notice from wireless-regdb somewhere on your new license. A custom license would enable third parties to enable on the Linux kernel custom 802.11 devices which may operate, for example, on actual licensed bands the end users have licenses for. Another example would be if a manufacturer has customized some 802.11 hardware and has verified the integrity of the modified hardware to operate on different frequencies and has taken the time to ensure regulatory compliance for usage of those cards. And yet another example would be the use of 802.11 hardware in research settings where regulatory compliance, depending on your jurisdiction, may allow you to use higher EIRP or custom frequencies for research purposes.

#### What is needed for end users

If you are customizing a regulatory database you need to redistribute three things:

- Your custom regulatory.bin
- Your public key
- A license for the above two

With the above an end user should be able to either build CRDA with gcrypt support to trust your regulatory.bin files or to just stuff it into the /etc/wireless-regdb/ directory if openssl support was enabled which allows dynamic reading of trusted public keys.

### CONFIG_CFG80211_CERTIFICATION_ONUS

The CONFIG_CFG80211_CERTIFICATION_ONUS is available for features which require additional regulatory compliance testing and validation by the system integrator. This allows us to define 802.11 specific kernel features under a flag that is intended by design to be **disabled by standard Linux distributions**, and only enabled by system integrators or distributions that **have done work** to ensure regulatory certification on the system with the enabled features. Regulatory verification may at times only be possible until you have the final system in place. Examples of features which depend on this option are DFS, cellular base station regulatory hints, custom 802.11 research features, and OEM / ODM chip verification features useful for testing / validation.

This option should only be enabled by system integrators or distributions that have done work necessary to ensure regulatory certification on the system with the enabled features. Alternatively you can enable this option if you are a wireless researcher and are working in a controlled and approved environment by your local regulatory agency.

### Processing rules

If you would like to become familiar with the cfg80211 algorithm used to process regulatory rules you can review this on the cfg80211 regulatory processing rules section.

### P2P howto

#### prerequisites

In order to test P2P, you need:

- a current wireless-testing kernel (or compat-wireless equivalent) or kernel 3.0 later
- wpa_supplicant from the hostap git tree:

```
git clone git://w1.fi/srv/git/hostap.git
```

, or possibly from the hostap-1 stabilisation tree

- an Atheros ath9k device
- OR an ar9170 USB device (with carl9170 driver!)
- (OR another device that has a mac80211 driver, but these are known to work, iwlwifi does **not**currently work with any released microcode)

#### wpa_supplicant

Use this config file for compiling:

```
CONFIG_DRIVER_NL80211=y
# optional, depending on libnl version you want to use:
# CONFIG_LIBNL20=y

CONFIG_CTRL_IFACE=y
CONFIG_WPS=y
CONFIG_WPS2=y
CONFIG_P2P=y
CONFIG_AP=y

# and maybe DBus
```

#### running

Start wpa_supplicant with this config file:

```
ctrl_interface=/var/run/wpa_supplicant
ap_scan=1

device_name=my-device-name
device_type=1-0050F204-1

# If you need to modify the group owner intent, 0-15, the higher
# number indicates preference to become the GO. You can also set
# this on p2p_connect commands.
#p2p_go_intent=15

# optional, can be useful for monitoring, forces
# wpa_supplicant to use only channel 1 rather than
# 1, 6 and 11:
#p2p_listen_reg_class=81
#p2p_listen_channel=1
#p2p_oper_reg_class=81
#p2p_oper_channel=1
```

like this:

```
./wpa_supplicant -Dnl80211 -c /path/to/p2p.conf -i wlan0 -dt
```

Then start `./wpa_cli` and use the various `p2p_*` commands, for example:

```
p2p_find
[wait for peer to be found]
p2p_connect <peer-mac-addr> pbc go_intent=<0..15>
```

(or you can use pin of course, go_intent is optional.)

### using multiple virtual interfaces for concurrent usage

If the driver advertises support, wpa_supplicant will automatically create secondary P2P interfaces. To force this without the driver advertising support, you can add the following to the config file:

```
driver_param=use_p2p_group_interface=1
```

When this is added, start the supplicant normally on wlan0 like above. Then, when P2P negotiation finishes, it will create a new interface for the group (called "p2p-wlan0-0") and put it into the appropriate mode (GO or P2P client).

### What this is about

For an introduction see the slides for the "Wi-Fi Peer-to-Peer on Linux" talk given by Johannes Berg during the Linux Plumbers Conference 2010.

### Basic P2P Architecture Stack

```
          |  <---------- D-Bus Application API
+--------------------+
| connection manager |
| or p2p control app |
+--------------------+
          |  <---------- D-Bus supplicant API
          |              or socket control interface
+--------------------+
| wpa_supplicant     |
+--------------------+
          |  <---------- nl80211
+--------------------+
| cfg80211           |
+--------------------+
          |  <---------- struct API
+--------------------+
| mac80211           |
+--------------------+
          |  <---------- mac80211's driver API
+--------------------+
| driver             |
+--------------------+
```

## Interfaces

### D-Bus Application API

```
NOTE: This doesn't exist yet! There's no integration
      with connection managers or any other control
      application yet!
```

We're currently working on seeing if this is at all feasible to define, but it would be good if applications could use a standard API that the connection manager offers. There are multiple reasons for having the connection manager offer this, like the need for a coordinator of all wifi usage.

Since there are multiple connections managers, a good approach to defining this would be a freedesktop.org standard.

### supplicant API

#### D-Bus API

API has been posted for review: http://thread.gmane.org/gmane.linux.drivers.hostap/22469

#### socket control interface

This interface offers basic P2P primitives like p2p_find, p2p_stop_find, p2p_connect, etc.

Here's a full list:

- p2p_find
- p2p_stop_find
- p2p_connect
- p2p_listen
- p2p_group_remove
- p2p_group_add
- p2p_prov_disc
- p2p_get_passphrase
- p2p_serv_disc_req
- p2p_serv_disc_cancel_req
- p2p_serv_disc_resp
- p2p_service_update
- p2p_serv_disc_external
- p2p_service_flush
- p2p_service_add
- p2p_service_del
- p2p_reject
- p2p_invite
- p2p_peers
- p2p_peer
- p2p_set
- p2p_flush
- p2p_presence_req

- p2p_ext_listen

This API can be used on dedicated/embedded systems like a printer, but applications that must play together with other applications can't really use it.

Both D-Bus and socket interfaces (will) also have events indicating when new P2P devices were found, etc.

### nl80211

Currently, the P2P-related extensions are:

- NL80211_CMD_REMAIN_ON_CHANNEL
- NL80211_CMD_CANCEL_REMAIN_ON_CHANNEL
  - This indicates to the device that it should stay on a given channel for a given time, to implement a P2P listen phase. Can also be canceled, since it is also used to implement off-channel TX for group negotiation or invitation (but see below)
- NL80211_CMD_FRAME (previously NL80211_CMD_ACTION)
  - Transmit a management frame, with channel checking. This can be used during a remain-on-channel phase to transmit frames on that channel, or at other times to transmit on the operating channel. This also allows off-channel transmission, i.e. transmit on a given channel and wait for a response for a given time (including the ability to cancel the wait) which in a sense combines REMAIN_ON_CHANNEL and MGMT_TX into just a single MGMT_TX for some operations. (wpa_supplicant changes for this enhanced offload haven't been merged upstream yet)
- NL80211_CMD_REGISTER_FRAME
  - Allow a userspace application to register for receiving a given type of (management) frame through nl80211, and also replying to it. Applications can also specify a filter so for example they don't have to handle all the different action frames but just a subset. For action frames, a side effect is that the kernel will not reply to unknown action frames when they are registered by userspace. Used by wpa_supplicant for P2P also for probe requests. Related events: NL80211_CMD_FRAME, NL80211_CMD_FRAME_TX_STATUS. Prior to some work, this was called NL80211_CMD_REGISTER_ACTION, NL80211_CMD_ACTION, NL80211_CMD_ACTION_TX_STATUS.
- (not a command) the ability to restrict the supported rates so
  - that the P2P requirement of not using 11b rates can be fulfilled. This is still somewhat WIP for scanning, action frame TX etc.

### cfg80211's struct API

This just mirrors nl80211 with function/method calls etc.

### mac80211's driver API

- A remain_on_channel (see above in nl80211) hardware offload
  - complete with canceling it and events
- WIP: complete hardware offload for mgmt-tx (see above in nl80211)
  - through a single function call

## Interface types

nl80211/cfg80211 currently define the P2P interface types P2P_CLIENT and P2P_GO, but wpa_supplicant doesn't use them, it still uses regular STA/AP interfaces. This is mostly because we haven't figured out a good way in the supplicant to distinguish between normal "STA" and P2P-client yet. The new P2P interface types will be needed later.

## Driver considerations

Drivers must currently only support AP and STA modes, and must be able to function during off-channel periods. They must also be able to receive probe requests even while in station mode, as indicated by mac80211 by the FIF_PROBE_REQ filter flag.

With the patches that I'm working on, drivers may optionally implement the p2p_start_listen/stop_listen callback to allow offload to the device for these operations. Additionally, they will be able to implement off-channel TX callbacks (but this is still WIP).

**Note: The design on this page is WIP:** **http://thread.gmane.org/gmane.linux.kernel.wireless.general/93044**

## Design notes on dedicated P2P interface API

### Rationale

Some drivers/devices would like to

- use a separate MAC address
- use a separate control path

for P2P usage. This could even help mac80211-based drivers like iwlagn since currently, iwlagn needs to enable P2P in the device when a remain-on-channel is done, and disable it after a timeout or when a P2P interface is used.

### API notes

A separate netdev would be the most obvious choice, but can be confusing:

- to the user – new interface is there, what does it do?
- to the developer – no data traffic on this interface

Better: use dedicated API in nl80211:

- start-P2P -> returns cookie
- stop-P2P -> uses cookie

(or maybe don't have "stop-P2P" but simply stop when socket is closed like mgmt frame subscriptions)

The only issue with this is that things like scan, mgmt-tx etc. need a netdev index now. However, this can be changed, idea:

- use cookie to identify the P2P device interface
- internally, create a `struct wireless_dev` but **without** a netdev
- modify cfg80211 API (e.g. `scan`, `remain_on_channel`) to take `struct wireless_dev` instead of netdev, driver can check what the type is etc.
- this needs separate P2P-device iftype that can't really be used as an iftype, which is fine

Questions:

- lifetime: does the P2P-device interface become the P2P-group/client interface like in wpa_supplicant, which means that it is removed before/when the real netdev is added? (personally I prefer it would stay around I think since I think discovery/public action things would still be done with it, not the real interface – Johannes)
- pure software implementation of this in mac80211 for drivers that don't care, to unify API? but wpa_s needs old code anyway for backward compatibility

### additional thoughts

This could also be a good framework for additional features that we'll need to add:

- device-based P2P listen/search timing (soon)
- maybe some more P2P offloads (WoP2P anyone? )

## Quality of Service:

In the field of telephony, quality of service was defined by the ITU in 1994.

"Quality of service comprises requirements on all the aspects of a connection, such as service response time, loss, signal-to-noise ratio, cross-talk, echo, interrupts, frequency response, loudness levels, and so on. A subset of telephony QoS is grade of service (GoS) requirements, which comprises aspects of a connection relating to capacity and coverage of a network, for example guaranteed maximum blocking probability and outage probability."

Traffic engineering

In the field of computer networking and other packet-switched telecommunication networks, the traffic engineering term refers to resource reservation control mechanisms rather than the achieved service quality.

Quality of service is the ability to provide different priority to different applications, users, or data flows, or to guarantee a certain level of performance to a data flow. For example, a required bit rate, delay, jitter, packet dropping probability and/or bit error rate may be guaranteed. Quality of service guarantees are important if the network capacity is insufficient, especially for real-time streaming multimedia applications such as voice over IP, online games and IP-TV, since these often require fixed bit rate and are delay sensitive, and in networks where the capacity is a limited resource, for example in cellular data communication.

Traffic Contract:

A network or protocol that supports QoS may agree on a traffic contract with the application software and reserve capacity in the network nodes, for example during a session establishment phase. During the session it may monitor the achieved level of performance, for example the data rate and delay, and dynamically control scheduling priorities in the network nodes. It may release the reserved capacity during a tear down phase.

Best –Effort Service:

A best-effort network or service does not support quality of service. An alternative to complex QoS control mechanisms is to provide high quality communication over a best-effort network by over-provisioning the capacity so that it is sufficient for the expected peak traffic load. The resulting absence of network congestion eliminates the need for QoS mechanisms.

## Qualities of traffic

In packet-switched networks, quality of service is affected by various factors, which can be divided into “human” and “technical” factors. Human factors include: stability of service, availability of service, delays, user information. Technical factors include: reliability, scalability, effectiveness, maintainability, grade of service, etc.[4]

Many things can happen to packets as they travel from origin to destination, resulting in the following problems as seen from the point of view of the sender and receiver:

**Low throughput**

Due to varying load from other users sharing the same network resources, the bit rate (the maximum throughput) that can be provided to a certain data stream may be too low for realtime multimedia services if all data streams get the same scheduling priority.

**Dropped packets**

The routers might fail to deliver (*drop*) some packets if their data is corrupted or they arrive when their buffers are already full. The receiving application may ask for this information to be retransmitted, possibly causing severe delays in the overall transmission.

**Errors**

Sometimes packets are corrupted due to bit errors caused by noise and interference, especially in wireless communications and long copper wires. The receiver has to detect this and, just as if the packet was dropped, may ask for this information to be retransmitted.

**Latency**

It might take a long time for each packet to reach its destination, because it gets held up in long queues, or takes a less direct route to avoid congestion. This is different from throughput, as the delay can build up over time, even if the throughput is almost normal. In some cases, excessive latency can render an application such as VoIP or online gaming unusable.

**Jitter**

Packets from the source will reach the destination with different delays. A packet's delay varies with its position in the queues of the routers along the path between source and destination and this position can vary unpredictably. This variation in delay is known as jitter and can seriously affect the quality of streaming audio and/or video.

**Out-of-order delivery**

When a collection of related packets is routed through a network, different packets may take different routes, each resulting in a different delay. The result is that the packets arrive in a different order than they were sent. This problem requires special additional protocols responsible for rearranging out-of-order packets to an isochronous state once they reach their destination. This is especially important for video and VoIP streams where quality is dramatically affected by both latency and lack of sequence.

WLAN Facts:

addressable unit : an entity participating in the wireless n/w. An addressable unit is simply the origin or/and destination of a message.STA is the addressable unit in WLAN.

How Physical and operational characteristics of an Addressable unit/STA are defined in WLAN?

by modifiers that are placed in front of the term STA.Possible modifiers are:

->fixed STA,
->portable STA, and
->mobile STA
->QoS STA
->Dependent STA
->Hidden STA

Facts About IEE082.11 PHYs:
limitations on wireless PHY ranges,
a) Use a medium that has neither absolute nor readily observable boundaries outside of which STAs with conformant PHY transceivers are known to be unable to receive network frames
b) Are unprotected from other signals that are sharing the medium
c) Communicate over a medium significantly less reliable than wired PHYs
d) Have dynamic topologies
e) Lack full connectivity, and therefore the assumption normally made that every STA can hear every other STA is invalid (i.e., STAs might be "hidden" from each other)
f) Have time-varying and asymmetric propagation properties
g) Might experience interference from logically disjoint IEEE 802.11 networks operating in overlapping areas.

Because of limitations on wireless PHY ranges, WLANs intended to cover reasonable geographic distances may be built from basic coverage building blocks.
When providing QoS services, the MAC makes effort to provide QoS "service guarantees" within the limitations of the medium properties identified above

Who is Mobile STA:

*Mobile* STA is one that is moved from location to location, and also accesses the LAN while in Motion. Another aspect of mobile STAs is that they may often be battery powered. Hence power management is an important consideration. For example, it cannot be presumed that a STA's receiver is always powered on

Who is Portable STA:

A *portable* STA is one that is moved from location to location, but that is only used while at a fixed location.that is portable STAs don't accesses the LAN while in Motion.

Note->Propagation effects blur the distinction between portable and mobile STAs; stationary STAs often appear to be mobile due to propagation effects.

What is the requirement on IEEE802.11 for WLAN implementation?

IEEE Std 802.11 is required to appear to higher layers [i.e. logical link control (LLC)] as a wired IEEE 802 LAN.

How Above requirement is achieved?

This requires that the IEEE 802.11 network handle STA mobility within the MAC sublayer. To meet reliability assumptions (that LLC makes about lower layers), it is necessary for IEEE Std 802.11 to incorporate functionality that is untraditional for MAC sublayers.

List the contribution of different IEEE standard in RSNA:
In a robust security network association (RSNA),

->IEEE Std 802.11 provides functions to protect data frames,
->IEEE Std 802.1X-2004 provides authentication and a Controlled Port, and
->IEEE Std 802.11 and IEEE Std 802.1X-2004 collaborate to provide key management.

All STAs in an RSNA have a corresponding IEEE 802.1X entity that handles these services. This standard defines how an RSNA utilizes IEEE Std 802.1X-2004 to access these services.

How IEEE 802.11 LAN supports applications with QoS requirements?
When used to support applications with QoS requirements, each IEEE 802.11 LAN provides a link within an end-to-end QoS environment that may be established between, and managed by, higher layer entities.

What are requirements to handle QoS traffic in manner comparable to IEEE802.11 LANs?
->To handle QoS traffic in a manner comparable to other IEEE 802 LANs, the IEEE 802.11 QoS facility requires the IEEE 802.11 MAC sublayers to incorporate functionality that is not traditional for MAC sublayers.

-> In addition, it may be necessary for certain higher layer management entities to be "WLAN aware" at least to the extent of understanding that the available bandwidth and other QoS characteristics of a WLAN are subject to frequent, and sometimes substantial, dynamic changes due to causes other than traffic load and are outside the direct control of network management entities.

## Components of the IEEE 802.11 architecture:

### 1. basic service set (BSS):

Definition1:
BSS is
->A set of stations (STAs) that have successfully synchronized using the JOIN service primitives , and
->one STA that has used the START primitive.

Definition2:
BSS is a set of STAs that have used the START primitive specifying matching mesh profiles where the match of the mesh profiles has been verified via the scanning procedure.

Definition3:
BSS is the basic building block of an IEEE 802.11 LAN. BSS has one or more STAs called its Member.
Each BSS has its own Coverage area,outside which its STAs can't remain in communication with tha BSS.
Membership of a STA with its BSS is Dynamic. That is STAs can move out from the coverage are of its BSS.once they roam out of coverage they are not member of this BSS anymore.STAs can turn on, turn off, come within range, and go out of range

**2.basic service area (BSA):**

The area containing the members of a basic service set (BSS). It might contain members of other BSSs.
If a STA moves out of its BSA, it can no longer directly communicate with other STAs present in the BSA.

3. **BSS transition:**

A station (STA) movement from one BSS to another BSS in the same extended service set (ESS).

4. **independent basic service set (IBSS):**

A basic service set (BSS) that forms a self-contained network, and in which no access to a distribution system (DS) is available. The IBSS is the most basic type of IEEE 802.11 LAN. A minimum IEEE 802.11 LAN may consist of only two STAs.

IBSS As Ad-Hoc N/w:
This mode of operation is possible when IEEE 802.11 STAs are able to communicate directly. Because this

type of IEEE 802.11 LAN is often formed without preplanning, for only as long as the LAN is needed, this type of operation is often referred to as an *ad hoc network*.

5.Infrastructured Basic service set (IBSS):

A basic service set (BSS) that forms a network from different self-contained networks, and in which access to a distribution system (DS) is available.

How a STA becomes the member of Infrastructured BSS?

To become a member of an infrastructure BSS or an IBSS, a STA joins the BSS using the synchronization procedure described in 10.1.4.5. To access all the services of an infrastructure BSS, a STA becomes "associated." These associations are dynamic and involve the use of the distribution system service (DSS), which is described in 4.4.3.

6. Mesh BSS:

A basic service set (BSS) that forms a self-contained network of mesh stations (STAs) that use the same mesh profile. An MBSS contains zero or more mesh gates, and can be formed from mesh STAs that are not in direct communication.

7. **mobile station (STA):**

A type of STA that uses network communications while in motion.

8. **mesh station (STA):**

A quality-of-service (QoS) STA that implements the mesh facility.

What is Mesh Facility?

**"**The set of enhanced functions, channel access rules, frame formats, mutual authentication methods, and managed objects used to provide data transfer among autonomously operating stations (STAs) that might not be in direct communication with each other over a single instance of the wireless medium."

Communication between STAs using the mesh facility takes place using only the wireless medium. The mesh facility transports an MSDU between source and destination STAs over potentially multiple hops of the wireless medium without transiting the MAC_SAP at intermediate STAs.

9. **mesh basic service set (MBSS):**

A basic service set (BSS) that forms a self-contained network of mesh stations (STAs) that use the same mesh profile. An MBSS contains zero or more mesh gates, and can be formed from mesh STAs that are not in direct communication. there is no central entity in a mesh BSS (MBSS).
Due to its distributed nature, a mesh BSS (MBSS) has no central entity like the AP of an infrastructure BSS. Instead, an MBSS forms a single set of independent mesh STAs. This set is indivisible and cannot be further unified. The ESS concept does not apply to the MBSS. However, it is possible to use a Mesh BSS as all or part of the DS that connects an ESS.

How a STA becomes the member of mesh BSS?
to become a member of a mesh BSS, a STA starts the transmission of Beacons and performs the synchronization

maintenance procedure described in 13.13.
A mesh STA does not become associated as there is no central entity in a mesh BSS (MBSS). Instead, a mesh STA peers with other mesh STAs.

9. **QoS STA:**

A STA that implements the QoS facility. A QoS STA acts as a non-QoS STA when associated in a non-QoS basic service set (BSS).

10. **quality-of-service (QoS) BSS:**

A BSS that provides the QoS facility. An infrastructure QoS BSS contains a QoS access point (AP).

11. **quality-of-service (QoS) IBSS:**

An IBSS in which one or more of its stations (STAs) support the QoS facility.

12. **Distribution system (DS):**

DS is The architectural component used to interconnect multiple infrastructure BSSs . The DS enables mobile device support by

->providing the logical services necessary to handle address to destination mapping, and
->seamless integration of multiple BSSs.

**STAs can be communicated using following ways:**
**->Either direct communication**
**->Or Indirect Communication (using APs and DS)**

The DS and infrastructure BSSs allow IEEE Std 802.11 to create a wireless network of arbitrary size and complexity.

**13.Access Point(AP):**

An access point (AP) is any entity that has STA functionality and enables access to the DS, via the WM for associated STAs. Data move between a BSS and the DS via an AP. Note that all APs are also STAs; thus they are addressable entities. The addresses used by an AP for communication on the WM and on the DSM are not necessarily the same.

14. **Extended service set (ESS):**

A set of one or more interconnected basic service sets (BSSs) that appears as a single BSS to the logical link control (LLC) layer at any station (STA) associated with one of those BSSs. An ESS is the union of the infrastructure BSSs with the same SSID connected by a DS. The ESS does not include the DS.
ESS network appears the same to an LLC layer as an IBSS network. STAs within an ESS may communicate and mobile STAs may move from one BSS to another (within the same ESS) transparently to LLC.

15. **extended service area (ESA):**

The area within which members of an extended service set (ESS) can communicate. An ESA is larger than or equal to a basic service area (BSA) and might involve several basic service sets (BSSs) in overlapping, disjointed, or both configurations.

16. **extended service set (ESS) transition:**

A station (STA) movement from one basic service set (BSS) in one ESS to another BSS in a different ESS.

**Robust security network association (RSNA):**

An RSNA is a standard which defines a number of security features in addition to wired equivalent privacy (WEP) and IEEE 802.11 authentication. These features include the following:
— Enhanced authentication mechanisms for STAs
— Key management algorithms
— Cryptographic key establishment
— Enhanced data cryptographic encapsulation mechanisms, such as Counter mode with Cipher-block chaining Message authentication code Protocol (CCMP), and, optionally, Temporal Key Integrity Protocol (TKIP).
— Fast basic service set (BSS) transition (FT) mechanism
— Enhanced cryptographic encapsulation mechanisms for robust management frames

An RSNA may rely on components external to the IEEE 802.11 architecture.following are some components:

1> IEEE 802.1X port access entity (PAE):
The first component is an IEEE 802.1X port access entity (PAE). PAEs are present on all STAs in an RSNA. PAEs controls the forwarding of data to and from the medium access control (MAC).

-An AP always implements the Authenticator PAE and Extensible Authentication Protocol (EAP) Authenticator roles.
- A non-AP STA always implements the Supplicant PAE and EAP peer roles.

In an IBSS each STA implements both the Authenticator PAE and Supplicant PAE roles and both EAP Authenticator and EAP peer roles.

2> Authentication Server (AS):
A second component is the Authentication Server (AS). The AS may authenticate the elements of the RSNA itself, i.e., the STAs may provide material that the RSNA elements use to authenticate each other. The AS communicates through the IEEE 802.1X Authenticator with the IEEE 802.1X Supplicant on each STA, enabling the STA to be authenticated to the AS and vice versa.

collocated coverage areas:

Portal:
A Portal is a *logical* architectural used To integrate the IEEE 802.11 architecture with a traditional wired LAN. A portal is the logical point at which MSDUs from an integrated non-IEEE-802.11 LAN enter the IEEE 802.11 DS. All data from non-IEEE-802.11 LANs enter the IEEE 802.11 architecture via a portal. The portal is the logical point at which the integration service is provided. The integration service is responsible for any addressing changes that might be required when MSDUs pass between the DS and the integrated LAN. It is possible for one device to offer both the functions of an AP and a portal.

**QoS BSS: The QoS network**

The IEEE 802.11 QoS facility provides MAC enhancements to support LAN applications with QoS requirements. The QoS enhancements are available to QoS STAs associated with a QoS access point in a QoS BSS.

A subset of the QoS enhancements is available for use between STAs that are members of the same QoS IBSS. Similarly, a subset of the QoS enhancements is available for use between neighbor peer mesh STAs.

Because a nonmesh QoS STA implements functionalities that is a superset of STA functionality, the STA might associate with a non-QoS access point in a non-QoS BSS, to provide non-QoS MAC data service when there is no QoS BSS with which to associate.
As a mesh STA does not implement the necessary service, the mesh STA does not associate with any access point.

QoS-specific mechanisms:

For infrastructure BSS and IBSS, this standard provides two mechanisms for the support of applications with QoS requirements.
1> *enhanced distributed channel access* (EDCA):
This mechanism delivers traffic based on differentiating user priorities (UPs). This differentiation is achieved by varying the following for different UP values:

-> Amount of time a STA senses the channel to be idle before backoff or transmission, or
-> The length of the contention window to be used for the backoff, or
->The duration a STA may transmit after it acquires the channel.

2> *hybrid coordination function* (HCF) *controlled channel access* (HCCA):
This mechanism allows for the reservation of transmission opportunities (TXOPs) with the hybrid coordinator(HC).

*QoS facility*:
The enhancements that distinguish QoS STAs from non-QoS STAs and QoS APs from non-QoS APs are collectively termed the *QoS facility*.

Which of the QoS-specific mechanisms a QoS STA supports might vary
->among QoS implementations, as well as
-> between QoS STAs and QoS APs.
Part of the core QoS facilities:
Following are the main part of the core QoS facilities
->All service primitives,
->frame formats,
->coordination function
->frame exchange rules,
->management interface functions except for the Block Acknowledgment (Block Ack) function,
->directlink setup (DLS), and
->automatic power save delivery (APSD).

A QoS STA or QoS AP implements those core QoS facilities necessary for its QoS functions to interoperate with other QoS STAs. Functions such as the Block Ack, DLS, and APSD are separate from the core QoS facilities; and the presence of these functions is indicated by STAs separately from the core QoS facilities.

## WLAN Radio Measurement:

Wireless LAN (WLAN) Radio Measurements
->enable STAs to understand the radio environment in which they exist.
->enable STAs to observe and gather data on radio link performance and on the radio environment.
->enable adjustment of STA operation to better suit the radio environment

A STA may choose to
->make measurements locally,
->request a measurement from another STA, or
->may be requested by another STA to make one or more measurements and return the results.

Radio Measurement data is made available to STA management and upper protocol layers where it may be used for a range of applications.

## Radio Measurement Service:

The Radio Measurement service includes measurements that extend the capability, reliability, and maintainability of WLANs by providing standard measurements across vendors, and the measurement service provides the resulting measurement data to upper layers in the communications stack.

In addition to featuring standard measurements and delivering measurement information to upper layers, there are applications that require quantifiable radio environment measurements in order to attain the necessary performance levels. These applications include VoIP, video over IP, location based applications, as well as applications requiring mitigation of harsh radio environments (multifamily dwellings, airplanes, factories, municipalities, etc.). Radio Measurements address most of the existing issues in using unlicensed radio spectrum to meet the requirements of these emerging technologies.

## General Measurement:

Types of Radio measurement To address the mobility requirements of technologies, such as VoIP and video streaming:

->Channel Load request/report and
->the Neighbor request/report

By accessing and using this information, the STAs (either in APs or in non-AP STAs) can make intelligent decisions about the most effective way to utilize the available spectrum, power, and bandwidth for their communications.

The request/report measurements are as follows:
-> beacon
->frame
->channel load
-> noise histogram
-> STA statistics
-> location configuration information (LCI)
-> neighbor report
-> link measurement
-> transmit stream/category measurement

The request-only mechanism is as follows:
-> measurement pause

The report-only mechanism is as follows:
-> measurement pilot

## Beacon Measurement/ Beacon frame:

The Beacon request/report pair enables a STA to request from another STA a list of APs whose beacons it can receive on a specified channel or channels.
This measurement may be done by active mode (like active scan), passive mode (like passive scan), or beacon table modes.

If the measurement request is in active mode, the measuring STA sends a probe request on the requested channel at the beginning of the measurement duration; then monitors the requested channel; measures beacon, probe response, and measurement pilot power levels (RCPI); and logs all beacons, probe responses, and measurement pilots received within the measurement duration

If the measurement request is accepted and is in passive mode, a duration timer is set. Then the measuring STA monitors the requested channel;
measures beacon, probe response, and measurement pilot power levels (received channel power indicator (RCPI)); and logs all beacons, probe responses, and measurement pilots received within the measurement duration.

If the measurement request is beacon table mode, then the measuring STA returns a Beacon Report containing the current contents of any stored beacon information for any supported channel with the requested service set identifier (SSID) and basic service set identifier (BSSID) without performing additional measurements.

## Measurement Pilot Frmae:

The Measurement Pilot frame provides a subset of the information provided in a Beacon frame, is smaller than a Beacon, and is transmitted more often than a Beacon. The purpose of the Measurement Pilot frame is to assist a STA with scanning.

## Frame Measurement :

The frame request/report pair returns a picture of all the channel traffic and a count of all the frames received at the measuring STA. For each unique Transmitter Address, the STA reports the

->Transmitter Address,
-> number of frames received from this transmitter,
->average power level (RCPI) for these frames, and
->BSSID of the transmitter.

## Channel load:

The channel load request/report pair returns the channel utilization measurement as observed by the measuring STA.

## Noise histogram:

The noise histogram request/report pair returns a power histogram measurement of non-IEEE 802.11 noise power by sampling the channel when virtual carrier sense indicates idle and the STA is neither transmitting nor receiving a frame.

**STA statistics:**

The STA statistics request/report pair returns groups of values for
>STA counters and for
> BSS Average Access Delay.

The STA counter group values include
->transmitted fragment counts,
->group addressed transmitted frame counts,
->failed counts,
->retry counts,
->multiple retry counts,
->frame duplicate counts,
->Request to Send (RTS) success counts,
->RTS failure counts,
->Acknowledgement (ACK) failure counts,
->received fragment counts,
->group addressed received frame counts,
->FCS error counts, and
->transmitted frame counts.

BSS Average Access Delay group values include
->AP average access delay,
->average access delay for each access category,
->associated STA count, and
->channel utilization.

**Location:**

The Location request/report pair returns a requested location in terms of latitude, longitude, and altitude. It includes types of altitude such as floors and permits various reporting resolutions. The requested location may be the location of the requestor (e.g., Where am I?) or the location of the reporting STA (e.g., Where are you?)

**Measurement pause:**

The measurement pause permits the inclusion of a quantified delay between the execution of individual measurements that are provided in a series within a measurement request frame. The measurement pause request is defined, but no report comes back from this request. The measurement pause used as the last measurement in a frame provides control of the measurement period when measurement request frames are to be repeated.

**Neighbor report:**

The neighbor report request is sent to an AP, which returns a neighbor report containing information about known neighbor APs that are candidates for a service set transition. Neighbor reports contain information from the table dot11RMNeighborReportTable in the MIB concerning neighbor APs. This request/report pair enables a STA to gain information about the neighbors of the associated AP to be used as potential roaming candidates.

**Link measurement:**

The link measurement request/report exchange provides measurements of the RF characteristics of a STA-to-STA link. This measurement indicates the instantaneous quality of a link.

**Dynamic STA enablement (DSE) in licensed bands:**

The DSE operating procedures are used to automate the channel provisioning and regulatory controls needed for unregistered IEEE 802.11 STAs to operate as dependent STAs in licensed spectrum.

**Contention-Based Protocol (CBP) in nonexclusively licensed bands:**

The granting of licenses on a nonexclusive, uncoordinated basis in the same area leads to the possibility of overlapping networks.overlapping networks cause co-channel interference.

When overlapping networks cause co-channel interference, regulations, such as those governing the 3650 MHz band in the United States, require the use of a CBP ".by using CBP, a transmitter provides reasonable opportunities for other transmitters to operate." IEEE 802.11 carrier sense multiple access with collision avoidance (CSMA/CA) is suitable CBP for this purpose in most situations,but not in all .

**Using DSE STA identification to resolve interference:**

When CSMA/CA is not able to sufficiently sense the presence of another licensee's STA (i.e., a hidden STA) or if a secondary licensee causes inference to a primary licensee, the licensee is obliged to resolve complaints that result from interference caused by any STA under its control (including dependent STAs).

In order to facilitate the interference resolution processes, all STAs operating in nonexclusively licensed spectrum use the following procedures:

>DSE STA procedures and

>location information procedures.

Note:In some licensed frequency bands, wireless equipment can be owned and operated by individuals who do not hold a license. In such instances, devices are permitted to operate only if they are either communicating with, or receiving permission to transmit from, a STA that is maintained by a licensed operator. The Japanese 4.9 GHz band and the U.S. 4.94–4.99 GHz public safety band are examples in which IEEE 802.11 STAs operate under such arrangements.

**High-throughput (HT) STA:**

>The IEEE 802.11 HT STA provides PHY and MAC features that can support a throughput of 100 Mb/s and greater, as measured at the MAC data service access point (SAP).

>An HT STA supports HT features as identified in Clause 9 and Clause 20.

>An HT STA operating in the 5 GHz band supports transmission and reception of frames that are compliant with mandatory PHY specifications as defined in Clause 18.

>An HT STA operating in the 2.4 GHz band supports transmission and reception of frames that are compliant with mandatory PHY specifications as defined in Clause 17 and Clause 19.

> An HT STA is also a QoS STA.

>The HT features are available to HT STAs associated with an HT AP in a BSS.

>A subset of the HT features is available for use between two HT STAs that are members of the same IBSS.

>Similarly, a subset of the HT features is available for use between two HT STAs that have established mesh peering

PHY Features of an HT STA:

An HT STA has PHY features consisting of the

> modulation and coding scheme (MCS) set described in 20.3.5 and

>physical layer convergence procedure (PLCP) protocol data unit (PPDU) formats described in 20.1.4.

Some PHY features that distinguish an HT STA from a non-HT STA are referred to as

> multiple input, multiple output (MIMO) operation;

> spatial multiplexing (SM);

>spatial mapping (including transmit beamforming);

>space-time block coding (STBC);

> low-density parity check (LDPC) encoding; and

> antenna selection (ASEL).

Possible PPDU format:
The allowed PPDU formats are
>non-HT format,
>HT-mixed format, and
>HT-greenfield format.
The PPDUs may be transmitted with 20 MHz or 40 MHz bandwidth.

MAC features of HT STA:
An HT STA has MAC features that include
>frame aggregation,
>some Block Ack features,
>power save multipoll(PSMP) operation,
> reverse direction (RD), and
>protection mechanisms supporting coexistence with non-HT STAs.

**Wireless network management:**

**Overview**

Wireless network management (WNM) enables STAs to exchange information for the purpose of improving the overall performance of the wireless network.
STAs use WNM protocols to exchange operational data so that each STA is aware of the network conditions, allowing STAs to be more cognizant of the topology and state of the network.
WNM protocols provide a means for STAs to be aware of the presence of collocated interference, and enable STAs to manage RF parameters based on network conditions.
In addition to providing information on network conditions, WNM also provides a means to

>exchange location information,
> provide support for the multiple BSSID capability on the same wireless infrastructure,
>support efficient delivery of group addressed frames, and
>enable a WNM-Sleep mode in which a STA can sleep for long periods of time without receiving frames from the AP.

The WNM service includes the following:

>BSS Max idle period management
> BSS transition management
> Channel usage
> Collocated interference reporting
> Diagnostic reporting
> Directed multicast service (DMS)
> Event reporting
> Flexible multicast service (FMS)
> Location services
> Multicast diagnostic reporting
> Multiple BSSID capability
> Proxy ARP
> QoS traffic capability
> SSID list
> Triggered STA statistics
> TIM broadcast

> Timing measurement
> Traffic filtering service
> U-APSD Coexistence

**BSS Max idle period management:**
BSS Max idle period management enables an AP to indicate a time period during which the AP does not disassociate a STA due to nonreceipt of frames from the STA. This supports improved STA power saving and AP resource management.

**BSS transition management:**
BSS transition management enables an AP to request non-AP STAs to transition to a specific AP, or to indicate to a non-AP STA a set of preferred APs, due to network load balancing or BSS Termination.

**Channel usage:**
Channel usage information is provided by the AP to the non-AP STA to recommend channels for noninfrastructure networks or an off-channel TDLS direct link. The non-AP STAs can use the channel usage information as part of channel selection processing for a noninfrastructure network or an off-channel TDLS direct link.

**Collocated interference reporting:**
Collocated interference reporting enables the requesting STA to obtain information on interference due to collocated radios at the reporting STA. The requesting STA can use that information to schedule its transmissions to minimize the effects of the interference.

**Diagnostic reporting:**
Diagnostic requests enable a STA to request a non-AP STA to report on information that may be helpful in diagnosing and resolving problems with the WLAN network. Diagnostic reports include information on hardware, configuration, and STA capabilities.

**Directed multicast service (DMS):**
The DMS enables a non-AP STA to request the AP to transmit group addressed frames destined to the requesting STA as individually addressed frames.

**Event reporting:**
Event requests enable a STA to request a non-AP STA to send particular real-time event messages.
The types of events include
>Transition Events,
>RSNA Events,
>WNM Log Events, and
>Peer-to-Peer Link events.

A transition event is transmitted after a non-AP STA successfully completes a BSS Transition. Transition events are used to diagnose transition performance problems.

An RSNA event report describes the type of Authentication used for the RSNA. RSNA events are used to diagnose security and authentication performance problems.

A WNM Log event report enables a non-AP STA to transmit a set of WNM Log event messages to the requesting STA. WNM Log event reports are used to access the contents of a STA's WNM Log.

A Peer-to- Peer Link event report enables a non-AP STA to inform the requesting STA that a Peer-to-Peer link has been established. Peer-to-Peer Link event reports are used to monitor the use of Peer-to-Peer links in the network.

**FMS(**flexible multicast service):
The flexible multicast service enables a non-AP STA to request an alternate delivery traffic indication map (DTIM) delivery interval for one or more sets of group addressed streams that the non-AP STA receives. This enables the non-AP STA to wake up at the alternate DTIM interval rather than every DTIM and enables significant power saving when a non-AP STA receives group addressed traffic. The FMS also enables a STA to establish a data rate and delivery interval for group addressed traffic higher than the minimum data rate available.
Delivery of group addressed data to power saving STAs using a DTIM beacon is described in 10.2.1.4.

**Location services:**
Location Configuration Request and Response frames enable STAs to configure a collection of location related parameters for Location Track Notification frames.
The AP can indicate that it can provide location data to support applications like emergency services.
Location services also provide the ability for STAs to exchange location information using Radio Measurement Request and Report frames.
The protocol supports exchange-by-value and exchange-by-reference mechanisms.
The location value can be exchanged in Geospatial (LCI) and Civic formats.
The location reference is a URL that defines from where the location value is retrieved.

**Multicast diagnostic reporting:**
Multicast diagnostic reports enable a non-AP STA to report statistics for multicast traffic it received from a transmitting STA. This can be used by an AP to measure quality of multicast reception by a non-AP STA.

**Multiple BSSID capability:**
The Multiple BSSID capability enables the advertisement of information for BSSIDs using a single Beacon or Probe Response frame instead of multiple Beacon and Probe Response frames, each corresponding to a single BSSID.
The Multiple BSSID capability also enables the indication of buffered frames for multiple BSSIDs using a single TIM element in a single beacon.

**Proxy ARP:**
The Proxy ARP capability enables an AP to indicate that the non-AP STA does not receive ARP frames.
The Proxy ARP capability enables the non-AP STA to remain in power save for longer periods of time.

**QoS traffic capability:**
QoS traffic capability procedures enable the QoS STA to indicate that it is capable of transmitting traffic belonging to the corresponding user priority (UP) from applications that require generation of such traffic.
The QoS Traffic Capability might be used for example as an input to estimate the blocking probability of a voice application based on the number of voice capable non-AP STAs.

**SSID list:**
The SSID List element enables the non-AP STA to request information on a list of SSIDs. This is intended to reduce the number of Probe Request frames sent by the non-AP STA.

**Triggered STA statistics:**
The Triggered STA Statistics reporting capability enables generation of a STA statistics report (see 4.3.8.9) when the statistics of interest reach a predefined threshold.

**TIM broadcast:**
The TIM broadcast protocol defines a mechanism to enable a STA to receive an indication of buffered individually addressed traffic, independent of the Beacon frame, reducing the wake time of the STA.

**Timing measurement:**

Timing Measurement frames allow a recipient STA to accurately measure the offset of its clock relative to a clock in the sending STA.

With the regular transfer of Timing Measurement frames from one STA to another, it is possible for the recipient STA to track changes in the offset of its clock with respect to the sending STA over time and thus detect and compensate for any drift between the clocks.

**Traffic filtering service:**

Traffic filtering is a service that may be provided by an AP to its associated STAs, where the AP examines MSDUs and management frames destined for a STA.

The AP determines if any of those frames match a specific set of traffic filters that may be enabled at the AP per the request of the STA.

Individually addressed frames that do not match any of the traffic filters in the set are discarded.

Individually addressed frames that do match at least one of the set of the enabled traffic filters are delivered to the STA.

The STA may alsonegotiate to have a notification frame sent prior to the delivery of the frame matching the traffic filter.

**U-APSD Coexistence:**

The U-APSD Coexistence capability enables the non-AP STA to indicate a requested transmission duration to the AP for use of U-APSD service periods.

Use of the transmission duration enables the AP to transmit frames during the service period and improve the likelihood that the non-AP STA receives the frames when the non-AP STA is experiencing interference.

The U-APSD Coexistence capability reduces the likelihood that the AP transmits frames during the service period that are not received successfully.

**WNM-Notification:**

WNM-Notification provides a mechanism for a STA to notify another STA of a management event.

One event is defined: firmware update notification.

**WNM-Sleep mode:**

WNM-Sleep mode is an extended power save mode for non-AP STAs in which a non-AP STA need not listen for every DTIM Beacon frame, and need not perform GTK/IGTK updates. WNM-Sleep mode enables a non-AP STA to signal to an AP that it will be sleeping for a specified length of time. This enables a non-AP STA to reduce power consumption and remain associated while the non-AP STA has no traffic to send to or receive from the AP.

**Subscription service provider network (SSPN) interface:**
An AP can interact with external networks using a SSPN interface .
AP performed this interaction for the following purpose
>For authenticating users and
>For provisioning services

The exchange of authentication and provisioning information between the SSPN and the AP passes transparently through the Portal.
The logical SSPN interface provides the means for an AP
>To consult an SSPN for authenticating and authorizing a specific non-AP STA, and
>To report statistics and status information to the SSPN.

Authentication and provisioning information for non-AP STAs received from the SSPN are stored in the AP management information base (MIB) and are used to limit layer-2 services provided to that non-AP STA.

Device Function:
>device function as a AP
>device function as a Portal
>device function as a Mesh gate

**Logical service interfaces:**
A DS may be created from many different technologies including current IEEE 802 wired LANs.
IEEE Std 802.11 does not constrain the DS to be either data link or network layer based.
Nor does IEEE Std 802.11constrain a DS to be either centralized or distributed in nature.

IEEE Std 802.11 specifies *services*. The services are associated with different components of the architecture.
There are two categories of IEEE 802.11 service—
1>the station service (SS) and
2>the distribution system service (DSS).
Both categories of service are used by the IEEE 802.11 MAC sublayer.

The complete set of IEEE 802.11 architectural services are as follows:
a) Authentication
b) Association
c) Deauthentication
d) Disassociation
e) Distribution
f) Integration
g) Data confidentiality
h) Reassociation
i) MSDU delivery
j) DFS
k) TPC
l) Higher layer timer synchronization (QoS facility only)
m) QoS traffic scheduling (QoS facility only)
n) Radio measurement
o) DSE

Above set of services is divided into two groups:
1>the SS and
2>the DSS.
The SS is part of every STA. The DSS is provided by the DS.

## SS (Station Service):

The service provided by STAs is known as the SS.
The SS is present in every IEEE 802.11 STA (including APs, as APs include STA functionality).
The SS is specified for use by MAC sublayer entities. All conformant STAs provide SS.
The SS is as follows:
a) Authentication (not used when dot11OCBActivated is true)
b) Deauthentication (not used when dot11OCBActivated is true)
c) Data confidentiality (not used when dot11OCBActivated is true)
d) MSDU delivery
e) DFS
f) TPC
g) Higher layer timer synchronization (QoS facility only)
h) QoS traffic scheduling (QoS facility only)
i) Radio measurement
j) DSE

## DSS(Distribution System service):

The service provided by the DS is known as the DSS.
This service is represented in the IEEE 802.11 architecture by arrows within APs and mesh gates, indicating that the service is used to cross media and possibly address space logical boundaries.
An AP and a mesh gate are logical entities, and the functions described may be shared by one or more physical entities.
The services that comprise the DSS are as follows:
a) Association (not mesh facility)
b) Disassociation (not mesh facility)
c) Distribution
d) Integration
e) Reassociation (not mesh facility)
f) QoS traffic scheduling (QoS facility only)
g) DSE
h) Interworking with the DS (mesh facility only)
DSSs are specified for use by MAC sublayer entities.

## Overview of IEEE802.11 Services:

There are many services specified by IEEE Std 802.11.
> Six of the services are used to support MSDU delivery between STAs.
> Three of the services are used to control IEEE 802.11 LAN access and confidentiality.
> Two of the services are used to provide spectrum management.
> One of the services provides support for LAN applications with QoS requirements.
> Another of the services provides support for higher layer timer synchronization.
> One of the services is used for radio measurement

Each of the services is supported by one or more MAC frame types.
Some of the services are supported by MAC management messages, and
Some of the services are supported by MAC data messages.

All of the messages gain access to the WM via the IEEE 802.11 MAC sublayer medium access method specified in Clause 9.

The IEEE 802.11 MAC sublayer uses three types of messages—

>*data messages*,
> *management messages*, and
>*control messages* (see Clause 8).

The data messages are handled via the MAC data service path.
MAC management messages are used to support the IEEE 802.11 services and are handled via the MAC management service path.
MAC control messages are used to support the delivery of IEEE 802.11 data and management messages.

IEEE 802.1X Supplicants
IEEE 802.1X Authenticators
IEEE 802.1X Port