

# Rockchip RV1126 GMAC TEST Report

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## 前言

## 概述

本文测试报告仅提供内部使用。

产品版本

芯片名称	内核版本
RV1126	Linux 4.19

读者对象

本文档（本指南）主要适用于以下工程师：

技术支持工程师 软件开发工程师

修订记录

版本号	作者	修改日期	修改说明
V1.0.0	吴达超	2020-03-31	初始版本

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# 1 Clock 配置

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## 1.1 RGMII mode

下面以 m1 为例子

### 1.1.1 PLL output 25M for PHY, PLL output 125M for TX\_CLK

```
1      assigned-clocks = <&cru CLK_GMAC_SRC>, <&cru CLK_GMAC_TX_RX>, <&cru
CLK_GMAC_ETHERNET_OUT>;
2      assigned-clock-parents = <&cru CLK_GMAC_SRC_M1>, <&cru RGMII_MODE_CLK>;
3      assigned-clock-rates = <125000000>, <0>, <25000000>;
4
5      pinctrl-names = "default";
6      pinctrl-0 = <&rgmiim1_pins &clk_out_ethernetm1_pins>;
```

### 1.1.2 PLL output 25M for PHY, RGMII\_CLK input 125M for TX\_CLK

```

1 diff --git a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
2 index 3cfc5aa2d3bc..1f42c9a93349 100644
3 --- a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
4 +++ b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
5 @@ -480,12 +480,12 @@
6         /* Reset time is 20ms, 100ms for rt18211f */
7         snps,reset-delays-us = <0 20000 100000>;
8
9 -     assigned-clocks = <&cru CLK_GMAC_SRC>, <&cru CLK_GMAC_TX_RX>, <&cru
10 CLK_GMAC_ETHERNET_OUT>;
11 -     assigned-clock-parents = <&cru CLK_GMAC_SRC_M1>, <&cru RGMII_MODE_CLK>;
12 -     assigned-clock-rates = <125000000>, <0>, <25000000>;
13 +     assigned-clocks = <&cru CLK_GMAC_RGMII_M1>, <&cru CLK_GMAC_SRC_M1>, <&cru
14 CLK_GMAC_SRC>, <&cru CLK_GMAC_TX_RX>, <&cru CLK_GMAC_ETHERNET_OUT>;
15 +     assigned-clock-parents = <&gmac_clkini_m1>, <&cru CLK_GMAC_RGMII_M1>, <&cru
16 CLK_GMAC_SRC_M1>, <&cru RGMII_MODE_CLK>;
17 +     assigned-clock-rates = <0>, <0>, <0>, <0>, <25000000>;
18
19     pinctrl-names = "default";
20 -     pinctrl-0 = <&rgmii1_pins &clk_out_ethernetm1_pins>;
21 +     pinctrl-0 = <&rgmii1_pins &gmac_clk_m1_pins &clk_out_ethernetm1_pins>;
22
23     tx_delay = <0x2a>;
24     rx_delay = <0x1a>;
25 @@ -494,6 +494,10 @@
26     status = "okay";
27 };
28
29 +&gmac_clkini_m1{
30 +     clock-frequency = <125000000>;
31 +};
32 +

```

### 1.1.3 Crytal 25M for PHY, PLL output 125M for TX\_CLK

```

1 diff --git a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
2 index 3cfc5aa2d3bc..70cf6bcf5b62 100644
3 --- a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
4 +++ b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
5 @@ -480,12 +480,12 @@
6      /* Reset time is 20ms, 100ms for rtl8211f */
7      snps,reset-delays-us = <0 20000 100000>;
8
9 -    assigned-clocks = <&cru CLK_GMAC_SRC>, <&cru CLK_GMAC_TX_RX>, <&cru
10 CLK_GMAC_ETHERNET_OUT>;
11 +    assigned-clocks = <&cru CLK_GMAC_SRC>, <&cru CLK_GMAC_TX_RX>;
12     assigned-clock-parents = <&cru CLK_GMAC_SRC_M1>, <&cru RGMII_MODE_CLK>;
13 -    assigned-clock-rates = <125000000>, <0>, <250000000>;
14 +    assigned-clock-rates = <125000000>, <0>;
15
16     pinctrl-names = "default";
17 -    pinctrl-0 = <&rgmii1_pins &clk_out_ethernetm1_pins>;
18 +    pinctrl-0 = <&rgmii1_pins>;
19
20     tx_delay = <0x2a>;
21     rx_delay = <0x1a>;

```

#### 1.1.4 Crytal 25M for PHY, RGMII\_CLK input 125M for TX\_CLK

```

1 diff --git a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
2 index 3cfc5aa2d3bc..7fb991780746 100644
3 --- a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
4 +++ b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
5 @@ -480,12 +480,12 @@
6         /* Reset time is 20ms, 100ms for rt18211f */
7         snps,reset-delays-us = <0 20000 100000>;
8
9 -     assigned-clocks = <&cru CLK_GMAC_SRC>, <&cru CLK_GMAC_TX_RX>, <&cru
10 CLK_GMAC_ETHERNET_OUT>;
11 -     assigned-clock-parents = <&cru CLK_GMAC_SRC_M1>, <&cru RGMII_MODE_CLK>;
12 -     assigned-clock-rates = <125000000>, <0>, <250000000>;
13 +     assigned-clocks = <&cru CLK_GMAC_RGMII_M1>, <&cru CLK_GMAC_SRC_M1>, <&cru
14 CLK_GMAC_SRC>, <&cru CLK_GMAC_TX_RX>;
15 +     assigned-clock-parents = <&gmac_clkini_m1>, <&cru CLK_GMAC_RGMII_M1>, <&cru
16 CLK_GMAC_SRC_M1>, <&cru RGMII_MODE_CLK>;
17 +     assigned-clock-rates = <0>, <0>, <0>, <0>;
18
19     pinctrl-names = "default";
20 -     pinctrl-0 = <&rgmiim1_pins &clk_out_ethernetm1_pins>;
21 +     pinctrl-0 = <&rgmiim1_pins &gmac_clk_m1_pins>;
22
23     tx_delay = <0x2a>;
24     rx_delay = <0x1a>;
25 @@ -494,6 +494,10 @@
26     status = "okay";
27 };
28
29 +&gmac_clkini_m1{
30 +     clock-frequency = <125000000>;
31 +};
32 +
33 +&i2c0 {
34     status = "okay";
35     clock-frequency = <100000>;

```

## 1.2 RMII mode

下面以 m0 为例子

### 1.2.1 RMII output mode

```

1 diff --git a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
2 index 38a054176bf8..4a85e4a4c6f9 100644
3 --- a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
4 +++ b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
5 @@ -472,20 +472,20 @@
6     };
7
8     &gmac {
9         - phy-mode = "rgmii";
10        - clock_in_out = "input";
11        + phy-mode = "rmii";
12        + clock_in_out = "output";
13
14        - snps,reset-gpio = <&gpio2 RK_PB1 GPIO_ACTIVE_LOW>;
15        + snps,reset-gpio = <&gpio3 RK_PA6 GPIO_ACTIVE_LOW>;
16        snps,reset-active-low;
17        /* Reset time is 20ms, 100ms for rtl8211f */
18        snps,reset-delays-us = <0 20000 100000>;
19
20        - assigned-clocks = <&cru CLK_GMAC_SRC>, <&cru CLK_GMAC_ETHERNET_OUT>;
21        - assigned-clock-parents = <&cru CLK_GMAC_SRC_M1>;
22        - assigned-clock-rates = <125000000>, <250000000>;
23        + assigned-clocks = <&cru CLK_GMAC_TX_RX>, <&cru CLK_GMAC_SRC>;
24        + assigned-clock-rates = <0>, <500000000>;
25        + assigned-clock-parents = <&cru RMII_MODE_CLK>;
26
27        pinctrl-names = "default";
28        - pinctrl-0 = <&rgmiim1_pins &clk_out_ethernetm1_pins>;
29        + pinctrl-0 = <&rmii0_pins &gmac_clk_m0_drv_level0_pins>;
30
31        - tx_delay = <0x2a>;
32        - rx_delay = <0x1a>;
33    };

```

## 1.2.2 RMII input mode

```

1 diff --git a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
2 index 38a054176bf8..4a140511aacd 100644
3 --- a/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
4 +++ b/arch/arm/boot/dts/rv11xx-evb-v10.dtsi
5 @@ -471,21 +471,25 @@
6         status = "okay";
7     };
8
9     &gmac {
10 -        phy-mode = "rgmii";
11 -        clock_in_out = "input";
12 +        phy-mode = "rmii";
13 +        clock_in_out = "output";
14
15 -        snps,reset-gpio = <&gpio2 RK_PB1 GPIO_ACTIVE_LOW>;
16 +        snps,reset-gpio = <&gpio3 RK_PA6 GPIO_ACTIVE_LOW>;
17         snps,reset-active-low;
18         /* Reset time is 20ms, 100ms for rtl8211f */
19         snps,reset-delays-us = <0 20000 100000>;
20
21 -        assigned-clocks = <&cru CLK_GMAC_SRC>, <&cru CLK_GMAC_ETHERNET_OUT>;
22 -        assigned-clock-parents = <&cru CLK_GMAC_SRC_M1>;
23 -        assigned-clock-rates = <125000000>, <25000000>;
24 +        assigned-clocks = <&cru CLK_GMAC_SRC_M0>, <&cru CLK_GMAC_SRC>, <&cru
25 CLK_GMAC_TX_RX>;
26 +        assigned-clock-rates = <0>, <50000000>;
27 +        assigned-clock-parents = <&cru CLK_GMAC_RGMII_M0>, <&cru CLK_GMAC_SRC_M0>, <&cru
28 RMII_MODE_CLK>;
29
30         pinctrl-names = "default";
31 -        pinctrl-0 = <&rgmiim1_pins &clk_out_ethernetm1_pins>;
32 +        pinctrl-0 = <&rmii0_pins &gmac_clk_m0_pins>;
33
34 -        tx_delay = <0x2a>;
35 -        rx_delay = <0x1a>;
36     };

```

## 2 默认代码性能测试

### 2.1 TCP 测试

#### 2.1.1 iperf2

- CPU 1G, DDR3 1000M, TCP



```

1 [root@Puma:/]# iperf -c 192.168.1.102 -i 1 -t 10 -w 400K
2 -----
3 Client connecting to 192.168.1.102, TCP port 5001
4 TCP window size: 320 KByte (WARNING: requested 400 KByte)
5 -----
6 [ 3] local 192.168.1.100 port 34890 connected with 192.168.1.102 port 5001
7 [ ID] Interval      Transfer    Bandwidth
8 [ 3] 0.0- 1.0 sec   113 MBytes  949 Mbits/sec
9 [ 3] 1.0- 2.0 sec   113 MBytes  949 Mbits/sec
10 [ 3] 2.0- 3.0 sec   113 MBytes  950 Mbits/sec
11 [ 3] 3.0- 4.0 sec   113 MBytes  949 Mbits/sec
12 [ 3] 4.0- 5.0 sec   113 MBytes  949 Mbits/sec
13 [ 3] 5.0- 6.0 sec   113 MBytes  950 Mbits/sec
14 [ 3] 6.0- 7.0 sec   113 MBytes  948 Mbits/sec
15 [ 3] 7.0- 8.0 sec   113 MBytes  950 Mbits/sec
16 [ 3] 8.0- 9.0 sec   113 MBytes  949 Mbits/sec
17 [ 3] 9.0-10.0 sec   113 MBytes  949 Mbits/sec
18 [ 3] 0.0-10.0 sec  1.10 GBytes  949 Mbits/sec

```

- CPU 1.5G, DDR3 1000M, TCP

```

1 [root@Puma:/]# iperf -c 192.168.1.102 -i 1 -t 100 -w 400K
2 CPU:  0% usr  4% sys  0% nic 90% idle  0% io  0% irq  4% sirq
3 Load average: 0.00 0.00 0.00 1/99 647
4  PID PPID USER  STAT  VSZ %VSZ %CPU COMMAND
5  644  582 root    S     22984  2%  2% iperf -c 192.168.1.102 -i 1 -t 100 -w
6  588  573 root    S       97m 10%  0% rknn_server
7  560   1 root    S    31548  3%  0% /usr/bin/adbd
8  502   1 root    S     7660  1%  0% /usr/sbin/ntpd -g
9  498   1 root    S     5772  1%  0% /usr/sbin/wpa_supplicant -u
10  490   1 root    S     4416  0%  0% /usr/sbin/connmand -n
11  509   1 avahi  S     3272  0%  0% avahi-daemon: running [Puma.local]
12  101   1 root    S     2968  0%  0% /sbin/udev -d
13  454   1 dbus   S     2820  0%  0% dbus-daemon --system
14  521   1 root    S     2496  0%  0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
15   1    0 root    S     2372  0%  0% init
16  91    1 root    S     2372  0%  0% /sbin/syslogd -n
17  94    1 root    S     2372  0%  0% /sbin/klogd -n
18  582   1 root    S     2372  0%  0% -/bin/sh
19  573   1 root    S     2372  0%  0% {start_rknn.sh} /bin/sh /usr/bin/start
20  647  582 root    R     2372  0%  0% top
21  517   1 root    S     2232  0%  0% /usr/sbin/dropbear -R
22  581   1 root    S     1736  0%  0% input-event-daemon -v /dev/input/event
23   9    2 root    SW      0  0%  0% [ksoftirqd/0]
24 [ 3] 2.0- 3.0 sec   113 MBytes  950 Mbits/sec
25 [ 3] 3.0- 4.0 sec   113 MBytes  949 Mbits/sec
26 [ 3] 4.0- 5.0 sec   113 MBytes  949 Mbits/sec

```

## 2.1.2 iperf3

- CPU 1G, DDR3 1000M, TCP

```

1 [root@Puma:/]# iperf3 -c 192.168.1.102 -i 1 -t 100 -w 300K &
2 [root@Puma:/]# Connecting to host 192.168.1.102, port 5201
3 [ 4] local 192.168.1.100 port 56858 connected to 192.168.1.102 port 5201
4 Mem: 73448K used, 953792K free, 532K shrd, 3120K buff, 37904K cached
5 CPU:  0% usr  7% sys  0% nic 84% idle  0% io  0% irq  6% sirq
6 Load average: 0.19 0.05 0.01 1/111 627
7   PID PPID USER   STAT  VSZ %VSZ %CPU COMMAND
8   623  587 root    R    2524  0%   6% iperf3 -c 192.168.1.102 -i 1 -t 100 -w
9   591  578 root    S      97m 10%   0% rknn_server
10  627  587 root    R    2372  0%   0% top
11  565   1 root    S   31548  3%   0% /usr/bin/adbd
12  508   1 root    S    7660  1%   0% /usr/sbin/ntpd -g
13  504   1 root    S    5772  1%   0% /usr/sbin/wpa_supplicant -u
14  496   1 root    S    4416  0%   0% /usr/sbin/connmand -n
15  514   1 avahi  S    3272  0%   0% avahi-daemon: running [Puma.local]
16  106   1 root    S    2968  0%   0% /sbin/udev -d
17  460   1 dbus   S    2820  0%   0% dbus-daemon --system
18  526   1 root    S    2496  0%   0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
19    1   0 root    S    2372  0%   0% init
20   96   1 root    S    2372  0%   0% /sbin/syslogd -n
21   99   1 root    S    2372  0%   0% /sbin/klogd -n
22  578   1 root    S    2372  0%   0% {start_rknn.sh} /bin/sh /usr/bin/start
23  587   1 root    S    2372  0%   0% -/bin/sh
24  522   1 root    S    2232  0%   0% /usr/sbin/dropbear -R
25  586   1 root    S    1736  0%   0% input-event-daemon -v /dev/input/event
26   53   2 root    IW      0  0%   0% [kworker/2:1-mm_]
27 [ 4] 38.00-39.00 sec  113 MBytes  949 Mbits/sec  0  473 KBytes
28 [ 4] 39.00-40.00 sec  113 MBytes  949 Mbits/sec  0  473 KBytes
29 [ 4] 40.00-41.00 sec  113 MBytes  949 Mbits/sec  0  473 KBytes
30 [ 4] 41.00-42.00 sec  113 MBytes  948 Mbits/sec  0  473 KBytes

```

- CPU 1.5G, DDR3 1000M, TCP

```

1 [root@Puma:/]# iperf3 -c 192.168.1.102 -i 1 -t 100 -w 300K
2 [root@Puma:/]# Connecting to host 192.168.1.102, port 5201
3 [ 4] local 192.168.1.100 port 56858 connected to 192.168.1.102 port 5201
4 Mem: 73956K used, 953288K free, 532K shrd, 3216K buff, 37976K cached
5 CPU:  0% usr  3% sys  0% nic 89% idle  0% io  0% irq  5% sirq
6 Load average: 0.02 0.01 0.00 1/103 641
7  PID PPID USER  STAT  VSZ %VSZ %CPU COMMAND
8  640  588 root    S     2524  0%   4% iperf3 -c 192.168.1.102 -i 1 -t 100 -w
9  594  579 root    S      97m 10%   0% rknn_server
10 641  588 root    R     2372  0%   0% top
11 566   1 root    S    31548  3%   0% /usr/bin/adbd
12 508   1 root    S     7660  1%   0% /usr/sbin/ntpd -g
13 504   1 root    S     5772  1%   0% /usr/sbin/wpa_supplicant -u
14 496   1 root    S     4416  0%   0% /usr/sbin/connmand -n
15 515   1 avahi  S     3272  0%   0% avahi-daemon: running [Puma.local]
16 106   1 root    S     2944  0%   0% /sbin/udev -d
17 460   1 dbus   S     2820  0%   0% dbus-daemon --system
18 527   1 root    S     2496  0%   0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
19 1     0 root    S     2372  0%   0% init
20 588   1 root    S     2372  0%   0% -/bin/sh
21 96    1 root    S     2372  0%   0% /sbin/syslogd -n
22 99    1 root    S     2372  0%   0% /sbin/klogd -n
23 579   1 root    S     2372  0%   0% {start_rknn.sh} /bin/sh /usr/bin/start
24 523   1 root    S     2232  0%   0% /usr/sbin/dropbear -R
25 587   1 root    S     1736  0%   0% input-event-daemon -v /dev/input/event
26 53    2 root    IW      0  0%   0% [kworker/2:1-mm_]
27 [ 4] 16.00-17.00 sec 113 MBytes 949 Mbits/sec 0 318 KBytes
28 [ 4] 17.00-18.00 sec 113 MBytes 949 Mbits/sec 0 318 KBytes
29 [ 4] 18.00-19.00 sec 113 MBytes 948 Mbits/sec 0 318 KBytes
30 [ 4] 19.00-20.00 sec 113 MBytes 950 Mbits/sec 0 318 KBytes

```

## 2.2 UDP 测试

### 2.2.1 iperf2

- CPU 1G, DDR3 1000M, UDP

```

1 [root@Puma:/]# iperf -c 192.168.1.102 -i 1 -t 10 -w 400K -u -b 1000M
2 -----
3 Client connecting to 192.168.1.102, UDP port 5001
4 Sending 1470 byte datagrams, IPG target: 11.22 us (kalman adjust)
5 UDP buffer size: 320 KByte (WARNING: requested 400 KByte)
6 -----
7 [ 3] local 192.168.1.101 port 37889 connected with 192.168.1.102 port 5001
8 [ 16.017222] random: crng init done
9 [ 16.017548] random: 1 urandom warning(s) missed due to ratelimiting
10 [ ID] Interval      Transfer    Bandwidth
11 [ 3] 0.0- 1.0 sec  83.9 MBytes 703 Mbits/sec
12 [ 3] 1.0- 2.0 sec  83.5 MBytes 701 Mbits/sec
13 [ 3] 2.0- 3.0 sec  83.4 MBytes 700 Mbits/sec
14 [ 3] 3.0- 4.0 sec  83.5 MBytes 701 Mbits/sec
15 [ 3] 4.0- 5.0 sec  83.5 MBytes 701 Mbits/sec
16 [ 3] 5.0- 6.0 sec  83.4 MBytes 700 Mbits/sec
17 [ 3] 6.0- 7.0 sec  83.5 MBytes 701 Mbits/sec
18 [ 3] 7.0- 8.0 sec  83.6 MBytes 701 Mbits/sec
19 [ 3] 8.0- 9.0 sec  83.5 MBytes 701 Mbits/sec
20 [ 3] 0.0-10.0 sec  836 MBytes 701 Mbits/sec
21 [ 3] Sent 596294 datagrams
22 [ 3] WARNING: did not receive ack of last datagram after 10 tries.

```

- CPU 1G, DDR3 1000M, UDP, -l 4000

```

1 [root@Puma:/]# iperf -c 192.168.1.102 -i 1 -t 10 -w 400K -u -b 1000M -l 4000
2 -----
3 Client connecting to 192.168.1.102, UDP port 5001
4 Sending 4000 byte datagrams, IPG target: 30.52 us (kalman adjust)
5 UDP buffer size: 320 KByte (WARNING: requested 400 KByte)
6 -----
7 [ 3] local 192.168.1.101 port 43790 connected with 192.168.1.102 port 5001
8 [ ID] Interval      Transfer    Bandwidth
9 [ 3] 0.0- 1.0 sec  96.8 MBytes 812 Mbits/sec
10 [ 3] 1.0- 2.0 sec  114 MBytes 956 Mbits/sec
11 [ 3] 2.0- 3.0 sec  114 MBytes 957 Mbits/sec
12 [ 3] 3.0- 4.0 sec  114 MBytes 956 Mbits/sec
13 [ 3] 4.0- 5.0 sec  114 MBytes 956 Mbits/sec
14 [ 3] 5.0- 6.0 sec  114 MBytes 956 Mbits/sec
15 [ 3] 6.0- 7.0 sec  114 MBytes 957 Mbits/sec
16 [ 3] 7.0- 8.0 sec  114 MBytes 957 Mbits/sec
17 [ 3] 8.0- 9.0 sec  114 MBytes 956 Mbits/sec
18 [ 3] 9.0-10.0 sec  114 MBytes 957 Mbits/sec
19 [ 3] 0.0-10.0 sec  1.10 GBytes 942 Mbits/sec
20 [ 3] Sent 294351 datagrams

```

- CPU 1.5G, DDR3 1000M, UDP

```

1 [root@Puma:/]# iperf -c 192.168.1.102 -i 1 -t 10 -w 400K -u -b 1000M
2 CPU:  2% usr  21% sys  0% nic  56% idle  0% io  5% irq  13% sirq
3 Load average: 0.15 0.03 0.01 1/108 630
4  PID PPID USER   STAT  VSZ %VSZ %CPU COMMAND
5  626  582 root    S    22984  2%  18% iperf -c 192.168.1.102 -i 1 -t 10 -w 4
6  629  582 root    R    2372  0%   1% top
7  588  573 root    S     97m 10%   0% rknn_server
8  560   1 root    S   31548  3%   0% /usr/bin/adbd
9  502   1 root    S    7660  1%   0% /usr/sbin/ntpd -g
10 498   1 root    S    5772  1%   0% /usr/sbin/wpa_supplicant -u
11 490   1 root    S    4416  0%   0% /usr/sbin/connmand -n
12 509   1 avahi   S    3272  0%   0% avahi-daemon: running [Puma.local]
13 101   1 root    S    2968  0%   0% /sbin/udev -d
14 454   1 dbus    S    2820  0%   0% dbus-daemon --system
15 521   1 root    S    2496  0%   0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
16   1   0 root    S    2372  0%   0% init
17  91   1 root    S    2372  0%   0% /sbin/syslogd -n
18  94   1 root    S    2372  0%   0% /sbin/klogd -n
19 582   1 root    S    2372  0%   0% -/bin/sh
20 573   1 root    S    2372  0%   0% {start_rknn.sh} /bin/sh /usr/bin/start
21 517   1 root    S    2232  0%   0% /usr/sbin/dropbear -R
22 581   1 root    S    1736  0%   0% input-event-daemon -v /dev/input/event
23   9   2 root    SW      0  0%   0% [ksoftirqd/0]
24 [  3]  8.0- 9.0 sec  114 MBytes  957 Mbits/secer/2:1-mm_]
25 [  3]  9.0-10.0 sec  114 MBytes  957 Mbits/sec
26 [  3]  0.0-10.0 sec  1.11 GBytes  954 Mbits/sec

```

## 2.2.2 iperf3

- CPU 1.5G, DDR3 1000M, UDP

```

1 [root@Puma:/]# iperf3 -c 192.168.1.102 -i 1 -t 100 -w 300K -u -b 1000M
2 Connecting to host 192.168.1.102, port 5201
3 [  4] local 192.168.1.101 port 57686 connected to 192.168.1.102 port 5201
4 [ ID] Interval           Transfer     Bandwidth       Total Datagrams
5 [  4]  0.00-1.00   sec  80.4 MBytes  675 Mbits/sec  57752
6 [  4]  1.00-2.00   sec  80.6 MBytes  676 Mbits/sec  57867
7 [  4]  2.00-3.00   sec  80.4 MBytes  674 Mbits/sec  57735
8 [  4]  3.00-4.00   sec  80.2 MBytes  673 Mbits/sec  57616
9 [  4]  4.00-5.00   sec  80.4 MBytes  675 Mbits/sec  57774
10 [  4]  5.00-6.00   sec  80.2 MBytes  673 Mbits/sec  57634
11 [  4]  6.00-7.00   sec  80.2 MBytes  673 Mbits/sec  57624
12 [  4]  7.00-8.00   sec  80.4 MBytes  675 Mbits/sec  57753
13 [  4]  8.00-9.00   sec  80.5 MBytes  675 Mbits/sec  57784
14 [  4]  9.00-10.00  sec  80.3 MBytes  674 Mbits/sec  57675
15 -----
16 [ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
17 [  4]  0.00-10.00  sec  1.76 GBytes  687 Mbits/sec  0.000 ms  0/1293819 (0%)
18

```

- CPU 1.5G, DDR3 1000M, UDP, -l 4000

```

1 [root@Puma:/]# iperf3 -c 192.168.1.100 -i 1 -t 10 -u -b 1000M -l 4000
2 Connecting to host 192.168.1.100, port 5201
3 [ 4] local 192.168.1.101 port 39962 connected to 192.168.1.100 port 5201
4 [ ID] Interval            Transfer      Bandwidth      Total Datagrams
5 [ 4]  0.00-1.00    sec    112 MBytes    937 Mbits/sec    29280
6 [ 4]  1.00-2.00    sec    114 MBytes    956 Mbits/sec    29887
7 [ 4]  2.00-3.00    sec    114 MBytes    956 Mbits/sec    29890
8 [ 4]  3.00-4.00    sec    114 MBytes    956 Mbits/sec    29889
9 [ 4]  4.00-5.00    sec    114 MBytes    957 Mbits/sec    29891
10 [ 4]  5.00-6.00    sec    114 MBytes    956 Mbits/sec    29890
11 [ 4]  6.00-7.00    sec    114 MBytes    956 Mbits/sec    29889
12 [ 4]  7.00-8.00    sec    114 MBytes    956 Mbits/sec    29891
13 [ 4]  8.00-9.00    sec    114 MBytes    956 Mbits/sec    29890
14 [ 4]  9.00-10.00   sec    114 MBytes    956 Mbits/sec    29890
15 [ ID] Interval            Transfer      Bandwidth      Jitter      Lost/Total Datagrams
16 [ 4]  0.00-10.00   sec    1.11 GBytes    955 Mbits/sec    0.008 ms    2/298287 (0.00067%)
17 [ 4] Sent 298287 datagrams
18

```

## 2 TSO 测试

### 2.1 关闭 TSO

```

1 [root@Puma:/]# ethtool -K eth0 tx-tcp-segmentation off
2 [root@Puma:/]# ethtool -K eth0 tx-tcp6-segmentation off

```

- iperf2 CPU 1.5G, DDR3 1000M, TCP

```

1 [root@Puma:/]# iperf -c 192.168.1.102 -i 1 -t 100 -w 400K
2 CPU:  0% usr  3% sys  0% nic 74% idle  0% io  3% irq 18% sirq
3 Load average: 0.03 0.02 0.00 1/100 658
4  PID PPID USER  STAT  VSZ %VSZ %CPU COMMAND
5  655  582 root    S    22984  2%  4% iperf -c 192.168.1.102 -i 1 -t 100 -w
6    9    2 root    SW      0  0%  2% [ksoftirqd/0]
7  588  573 root    S     97m 10%  0% rknn_server
8  658  582 root    R    2372  0%  0% top
9  560    1 root    S   31548  3%  0% /usr/bin/adbd
10 502    1 root    S    7660  1%  0% /usr/sbin/ntpd -g
11 498    1 root    S    5772  1%  0% /usr/sbin/wpa_supplicant -u
12 490    1 root    S    4416  0%  0% /usr/sbin/connmand -n
13 509    1 avahi  S    3272  0%  0% avahi-daemon: running [Puma.local]
14 101    1 root    S    2968  0%  0% /sbin/udev -d
15 454    1 dbus    S    2820  0%  0% dbus-daemon --system
16 521    1 root    S    2496  0%  0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
17   1    0 root    S    2372  0%  0% init
18  91    1 root    S    2372  0%  0% /sbin/syslogd -n
19  94    1 root    S    2372  0%  0% /sbin/klogd -n
20 582    1 root    S    2372  0%  0% -/bin/sh
21 573    1 root    S    2372  0%  0% {start_rknn.sh} /bin/sh /usr/bin/start
22 517    1 root    S    2232  0%  0% /usr/sbin/dropbear -R
23 581    1 root    S    1736  0%  0% input-event-daemon -v /dev/input/event
24 [  3] 13.0-14.0 sec  113 MBytes  948 Mbits/secer/3:0-mm_]
25 [root@Puma:/]# [  3] 14.0-15.0 sec  113 MBytes  951 Mbits/sec
26 [  3] 15.0-16.0 sec  113 MBytes  949 Mbits/sec
27 [  3] 16.0-17.0 sec  113 MBytes  949 Mbits/sec
28 [  3] 17.0-18.0 sec  113 MBytes  949 Mbits/sec
29 655[  3] 18.0-19.0 sec  113 MBytes  949 Mbits/sec

```

- iperf3 CPU 1.0G, DDR3 1000M, TCP

```

1 [root@Puma:/]# iperf3 -c 192.168.1.102 -i 1 -t 100 -w 300K
2 Mem: 74452K used, 952788K free, 536K shrd, 3852K buff, 38148K cached
3 CPU:  0% usr  7% sys  0% nic 72% idle  0% io  2% irq 17% sirq
4 Load average: 0.14 0.05 0.01 1/103 634
5  PID PPID USER   STAT  VSZ %VSZ %CPU COMMAND
6  632  587 root    S     2524  0% 10% iperf3 -c 192.168.1.102 -i 1 -t 100 -w
7    9    2 root    SW      0  0%  8% [ksoftirqd/0]
8  634  587 root    R     2372  0%  3% top
9  591  578 root    S      97m 10%  0% rknn_server
10 565    1 root    S    31548  3%  0% /usr/bin/adbd
11 508    1 root    S     7660  1%  0% /usr/sbin/ntpd -g
12 504    1 root    S     5772  1%  0% /usr/sbin/wpa_supplicant -u
13 496    1 root    S     4416  0%  0% /usr/sbin/connmand -n
14 514    1 avahi  S     3272  0%  0% avahi-daemon: running [Puma.local]
15 106    1 root    S     2968  0%  0% /sbin/udevd -d
16 460    1 dbus   S     2820  0%  0% dbus-daemon --system
17 526    1 root    S     2496  0%  0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
18  1    0 root    S     2372  0%  0% init
19  96    1 root    S     2372  0%  0% /sbin/syslogd -n
20  99    1 root    S     2372  0%  0% /sbin/klogd -n
21 587    1 root    S     2372  0%  0% -/bin/sh
22 578    1 root    S     2372  0%  0% {start_rknn.sh} /bin/sh /usr/bin/start
23 522    1 root    S     2232  0%  0% /usr/sbin/dropbear -R
24 586    1 root    S     1736  0%  0% input-event-daemon -v /dev/input/event
25 [  4] 19.00-20.00 sec 113 MBytes 949 Mbits/sec  0 305 KBytes
26 [  4] 20.00-21.00 sec 113 MBytes 950 Mbits/sec  0 305 KBytes

```

## 2.2 TSO 开启

```

1 [root@Puma:/]# ethtool -K eth0 tx-tcp-segmentation on
2 [root@Puma:/]# ethtool -K eth0 tx-tcp6-segmentation on

```

- iperf2 CPU 1.5G, DDR3 1000M, TCP



```

1 [root@Puma:/]# iperf -c 192.168.1.102 -i 1 -t 100 -w 400K
2 CPU:  0% usr  4% sys  0% nic 90% idle  0% io  0% irq  4% sirq
3 Load average: 0.00 0.00 0.00 1/99 647
4  PID PPID USER  STAT  VSZ %VSZ %CPU COMMAND
5  644  582 root    S    22984  2%  2% iperf -c 192.168.1.102 -i 1 -t 100 -w
6  588  573 root    S      97m 10%  0% rknn_server
7  560   1 root    S   31548  3%  0% /usr/bin/adbd
8  502   1 root    S    7660  1%  0% /usr/sbin/ntpd -g
9  498   1 root    S    5772  1%  0% /usr/sbin/wpa_supplicant -u
10 490   1 root    S    4416  0%  0% /usr/sbin/connmand -n
11 509   1 avahi  S    3272  0%  0% avahi-daemon: running [Puma.local]
12 101   1 root    S    2968  0%  0% /sbin/udev -d
13 454   1 dbus   S    2820  0%  0% dbus-daemon --system
14 521   1 root    S    2496  0%  0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
15   1   0 root    S    2372  0%  0% init
16  91   1 root    S    2372  0%  0% /sbin/syslogd -n
17  94   1 root    S    2372  0%  0% /sbin/klogd -n
18 582   1 root    S    2372  0%  0% -/bin/sh
19 573   1 root    S    2372  0%  0% {start_rknn.sh} /bin/sh /usr/bin/start
20 647  582 root    R    2372  0%  0% top
21 517   1 root    S    2232  0%  0% /usr/sbin/dropbear -R
22 581   1 root    S    1736  0%  0% input-event-daemon -v /dev/input/event
23   9   2 root    SW      0  0%  0% [ksoftirqd/0]
24 [  3] 2.0- 3.0 sec  113 MBytes  950 Mbits/sec
25 [  3] 3.0- 4.0 sec  113 MBytes  949 Mbits/sec
26 [  3] 4.0- 5.0 sec  113 MBytes  949 Mbits/sec

```

- iperf3 CPU 1.5G, DDR3 1000M, TCP

```

1 [root@Puma:/]# iperf3 -c 192.168.1.102 -i 1 -t 100 -w 300K
2 CPU:  0% usr  3% sys  0% nic 90% idle  0% io  0% irq  5% sirq
3 Load average: 0.01 0.01 0.00 2/97 678
4  PID PPID USER  STAT  VSZ %VSZ %CPU COMMAND
5  677  582 root    S     2524  0%  4% iperf3 -c 192.168.1.102 -i 1 -t 100 -w
6  588  573 root    S       97m 10%  0% rknn_server
7  678  582 root    R     2372  0%  0% top
8  560   1 root    S    31548  3%  0% /usr/bin/adbd
9  502   1 root    S     7660  1%  0% /usr/sbin/ntpd -g
10 498   1 root    S     5772  1%  0% /usr/sbin/wpa_supplicant -u
11 490   1 root    S     4416  0%  0% /usr/sbin/connmand -n
12 509   1 avahi  S     3272  0%  0% avahi-daemon: running [Puma.local]
13 101   1 root    S     2968  0%  0% /sbin/udev -d
14 454   1 dbus   S     2820  0%  0% dbus-daemon --system
15 521   1 root    S     2496  0%  0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
16 1     0 root    S     2372  0%  0% init
17 582   1 root    S     2372  0%  0% -/bin/sh
18 91    1 root    S     2372  0%  0% /sbin/syslogd -n
19 94    1 root    S     2372  0%  0% /sbin/klogd -n
20 573   1 root    S     2372  0%  0% {start_rknn.sh} /bin/sh /usr/bin/start
21 517   1 root    S     2232  0%  0% /usr/sbin/dropbear -R
22 581   1 root    S     1736  0%  0% input-event-daemon -v /dev/input/event
23 9     2 root    SW      0  0%  0% [ksoftirqd/0]
24 [ 4]  9.00-10.00 sec 113 MBytes 950 Mbits/sec 0 319 KBytes
25 [ 4] 10.00-11.00 sec 113 MBytes 949 Mbits/sec 0 319 KBytes
26 [ 4] 11.00-12.00 sec 113 MBytes 949 Mbits/sec 0 319 KBytes
27 [ 4] 12.00-13.00 sec 113 MBytes 950 Mbits/sec 0 319 KBytes

```

- iperf3 CPU 1.0G, DDR3 1000M, TCP

```

1 [root@Puma:/]# iperf3 -c 192.168.1.102 -i 1 -t 100 -w 300K &
2 [root@Puma:/]# Connecting to host 192.168.1.102, port 5201
3 [ 4] local 192.168.1.100 port 56876 connected to 192.168.1.102 port 5201
4 Mem: 87836K used, 939404K free, 536K shrd, 17568K buff, 38148K cached
5 CPU:  0% usr  5% sys  0% nic 85% idle  0% io  0% irq  7% sirq
6 Load average: 0.16 0.06 0.02 1/103 701
7  PID PPID USER  STAT  VSZ %VSZ %CPU COMMAND
8  698  587 root    S     2524  0%   5% iperf3 -c 192.168.1.102 -i 1 -t 100 -w
9  591  578 root    S      97m 10%   0% rknn_server
10 699  587 root    R     2372  0%   0% top
11 565   1 root    S    31548  3%   0% /usr/bin/adbd
12 508   1 root    S     7660  1%   0% /usr/sbin/ntpd -g
13 504   1 root    S     5772  1%   0% /usr/sbin/wpa_supplicant -u
14 496   1 root    S     4416  0%   0% /usr/sbin/connmand -n
15 514   1 avahi  S     3272  0%   0% avahi-daemon: running [Puma.local]
16 106   1 root    S     2968  0%   0% /sbin/udev -d
17 460   1 dbus    S     2820  0%   0% dbus-daemon --system
18 526   1 root    S     2496  0%   0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
19 1     0 root    S     2372  0%   0% init
20 587   1 root    S     2372  0%   0% -/bin/sh
21 96    1 root    S     2372  0%   0% /sbin/syslogd -n
22 99    1 root    S     2372  0%   0% /sbin/klogd -n
23 578   1 root    S     2372  0%   0% {start_rknn.sh} /bin/sh /usr/bin/start
24 522   1 root    S     2232  0%   0% /usr/sbin/dropbear -R
25 586   1 root    S     1736  0%   0% input-event-daemon -v /dev/input/event
26 9     2 root    SW      0  0%   0% [ksoftirqd/0]
27 [ 4] 48.00-49.00 sec 113 MBytes 949 Mbits/sec 0 304 KBytes
28 [ 4] 49.00-50.00 sec 113 MBytes 949 Mbits/sec 0 304 KBytes

```

从以上对比测试来看，TSO 开启，CPU IDLE 时间增加 15%左右。

### 3 USO 测试

patch for gso\_size 1470

```

1 diff --git a/drivers/net/ethernet/stmicro/stmmac/stmmac_main.c
  b/drivers/net/ethernet/stmicro/stmmac/stmmac_main.c
2 index 419fb60e9782..5b0469ea2dcd 100644
3 --- a/drivers/net/ethernet/stmicro/stmmac/stmmac_main.c
4 +++ b/drivers/net/ethernet/stmicro/stmmac/stmmac_main.c
5 @@ -4387,6 +4387,11 @@ int stmmac_dvr_probe(struct device *device,
6         ndev->hw_features |= NETIF_F_TSO | NETIF_F_TSO6;
7         if (priv->plat->has_gmac4)
8             ndev->hw_features |= NETIF_F_GSO_UDP_L4;
9 +
10 +         ndev->hw_features |= NETIF_F_GSO_PARTIAL;
11 +         ndev->gso_partial_features |= NETIF_F_GSO_UDP_L4;
12 +         ndev->features |= NETIF_F_GSO_UDP_L4;
13 +
14         priv->tso = true;
15         dev_info(priv->device, "TSO feature enabled\n");
16     }
17 diff --git a/net/ipv4/udp.c b/net/ipv4/udp.c
18 index 0ef04cda1b27..4c8469619b16 100644
19 --- a/net/ipv4/udp.c
20 +++ b/net/ipv4/udp.c
21 @@ -993,6 +993,7 @@ int udp_sendmsg(struct sock *sk, struct msghdr *msg, size_t len)
22         connected = 1;
23     }
24
25 +     up->gso_size = 1470;
26     ipcm_init_sk(&ipc, inet);
27     ipc.gso_size = up->gso_size;

```

## 3.1 USO 关闭

```
1 ethtool -K eth0 tx-udp-segmentation off
```

### 3.1.1 iperf2

### 3.1.2 iperf3

- iperf3 CPU 1.5G, DDR3 1000M, -I 4000, UDP

```

1 [root@Puma:/]# iperf3 -c 192.168.1.101 -i 1 -t 100 -w 300K -u -b 1000M -l 4000
2 Mem: 72360K used, 954880K free, 412K shrd, 3392K buff, 38020K cached
3 CPU:  0% usr 26% sys  0% nic 56% idle  0% io  4% irq 12% sirq
4 Load average: 1.00 0.45 0.17 2/104 651
5  PID PPID USER  STAT  VSZ %VSZ %CPU COMMAND
6  650  588 root    R    2400  0% 27% iperf3 -c 192.168.1.101 -i 1 -t 100 -w
7  651  588 root    R    2372  0%  2% top
8  592  579 root    S     97m 10%  0% rknn_server
9  566   1 root    S   31548  3%  0% /usr/bin/adbd
10 508   1 root    S    7660  1%  0% /usr/sbin/ntpd -g
11 504   1 root    S    5772  1%  0% /usr/sbin/wpa_supplicant -u
12 496   1 root    S    4416  0%  0% /usr/sbin/connmand -n
13 515   1 avahi  S    3272  0%  0% avahi-daemon: running [Puma.local]
14 107   1 root    S    2952  0%  0% /sbin/udev -d
15 460   1 dbus    S    2820  0%  0% dbus-daemon --system
16 527   1 root    S    2496  0%  0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
17   1   0 root    S    2372  0%  0% init
18 588   1 root    S    2372  0%  0% -/bin/sh
19 100   1 root    S    2372  0%  0% /sbin/klogd -n
20  97   1 root    S    2372  0%  0% /sbin/syslogd -n
21 579   1 root    S    2372  0%  0% {start_rknn.sh} /bin/sh /usr/bin/start
22 523   1 root    S    2232  0%  0% /usr/sbin/dropbear -R
23 587   1 root    S    1736  0%  0% input-event-daemon -v /dev/input/event
24   9   2 root    SW      0  0%  0% [ksoftirqd/0]
25 [  4]  8.00-9.00 sec 77.4 MBytes 650 Mbits/sec 20303
26 [  4]  9.00-10.00 sec 77.6 MBytes 651 Mbits/sec 20344
27 [  4] 10.00-11.00 sec 77.6 MBytes 651 Mbits/sec 20333

```

- iperf3 CPU 1.5G, DDR3 1000M, -I 16000, UDP

```

1 Mem: 72984K used, 954256K free, 424K shrd, 3908K buff, 38040K cached
2 CPU:  0% usr 10% sys  0% nic 67% idle  0% io  5% irq 17% sirq
3 Load average: 0.36 0.55 0.35 2/103 663
4  PID PPID USER  STAT  VSZ %VSZ %CPU COMMAND
5  662  588 root    R    2412  0% 10% iperf3 -c 192.168.1.101 -i 1 -t 100 -w
6    9    2 root    SW      0  0%  5% [ksoftirqd/0]
7  663  588 root    R    2372  0%  3% top
8  592  579 root    S     97m 10%  0% rknn_server
9  566    1 root    S   31548  3%  0% /usr/bin/adbd
10  508    1 root    S    7660  1%  0% /usr/sbin/ntpd -g
11  504    1 root    S    5772  1%  0% /usr/sbin/wpa_supplicant -u
12  496    1 root    S    4416  0%  0% /usr/sbin/connmand -n
13  515    1 avahi  S    3272  0%  0% avahi-daemon: running [Puma.local]
14  107    1 root    S    2952  0%  0% /sbin/udev -d
15  460    1 dbus  S    2820  0%  0% dbus-daemon --system
16  527    1 root    S    2496  0%  0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
17    1    0 root    S    2372  0%  0% init
18  588    1 root    S    2372  0%  0% -/bin/sh
19  100    1 root    S    2372  0%  0% /sbin/klogd -n
20   97    1 root    S    2372  0%  0% /sbin/syslogd -n
21  579    1 root    S    2372  0%  0% {start_rknn.sh} /bin/sh /usr/bin/start
22  523    1 root    S    2232  0%  0% /usr/sbin/dropbear -R
23  587    1 root    S    1736  0%  0% input-event-daemon -v /dev/input/event
24 [  4]  3.00-4.00 sec 114 MBytes 957 Mbits/sec 7474
25 [  4]  4.00-5.00 sec 114 MBytes 957 Mbits/sec 7473
26 [  4]  5.00-6.00 sec 114 MBytes 957 Mbits/sec 7474

```

## 3.2 USO 开启

```
1 | ethtool -K eth0 tx-udp-segmentation on
```

### 3.2.1 iperf2

### 3.2.2 iperf3

- iperf3 CPU 1.5G, DDR3 1000M, -I 4000, UDP

```

1 [root@Puma:/]# iperf3 -c 192.168.1.101 -i 1 -t 100 -w 300K -u -b 1000M -l 4000
2 Mem: 72652K used, 954588K free, 412K shrd, 3640K buff, 38024K cached
3 CPU:  2% usr 23% sys  0% nic 65% idle  0% io  2% irq  6% sirq
4 Load average: 0.61 0.63 0.29 2/105 656
5  PID PPID USER  STAT  VSZ %VSZ %CPU COMMAND
6  654  588 root    R    2400  0% 25% iperf3 -c 192.168.1.101 -i 1 -t 100 -w
7  592  579 root    S      97m 10%  0% rknn_server
8  655  588 root    R    2372  0%  0% top
9  566   1 root    S   31548  3%  0% /usr/bin/adbd
10 508   1 root    S    7660  1%  0% /usr/sbin/ntpd -g
11 504   1 root    S    5772  1%  0% /usr/sbin/wpa_supplicant -u
12 496   1 root    S    4416  0%  0% /usr/sbin/connmand -n
13 515   1 avahi  S    3272  0%  0% avahi-daemon: running [Puma.local]
14 107   1 root    S    2952  0%  0% /sbin/udev -d
15 460   1 dbus    S    2820  0%  0% dbus-daemon --system
16 527   1 root    S    2496  0%  0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
17   1   0 root    S    2372  0%  0% init
18 588   1 root    S    2372  0%  0% -/bin/sh
19 100   1 root    S    2372  0%  0% /sbin/klogd -n
20  97   1 root    S    2372  0%  0% /sbin/syslogd -n
21 579   1 root    S    2372  0%  0% {start_rknn.sh} /bin/sh /usr/bin/start
22 523   1 root    S    2232  0%  0% /usr/sbin/dropbear -R
23 587   1 root    S    1736  0%  0% input-event-daemon -v /dev/input/event
24   9   2 root    SW      0  0%  0% [ksoftirqd/0]
25 [  4] 11.00-12.00 sec 83.6 MBytes 702 Mbits/sec 21922
26 [  4] 12.00-13.00 sec 83.8 MBytes 703 Mbits/sec 21976
27 [  4] 13.00-14.00 sec 83.9 MBytes 704 Mbits/sec 21988

```

- iperf3 CPU 1.5G, DDR3 1000M, -I 16000, UDP

```

1 [root@Puma:/]# iperf3 -c 192.168.1.101 -i 1 -t 100 -w 300K -u -b 1000M -l 16000
2 Mem: 73168K used, 954072K free, 424K shrd, 3804K buff, 38036K cached
3 CPU:  0% usr  9% sys  0% nic 82% idle  0% io  0% irq  7% sirq
4 Load average: 0.43 0.60 0.34 1/103 660
5  PID PPID USER   STAT  VSZ %VSZ %CPU COMMAND
6    659   588 root    S     2412  0% 12% iperf3 -c 192.168.1.101 -i 1 -t 100 -w
7    592   579 root    S       97m 10%  0% rknn_server
8    566     1 root    S    31548  3%  0% /usr/bin/adbd
9    508     1 root    S     7660  1%  0% /usr/sbin/ntpd -g
10   504     1 root    S     5772  1%  0% /usr/sbin/wpa_supplicant -u
11   496     1 root    S     4416  0%  0% /usr/sbin/connmand -n
12   515     1 avahi   S     3272  0%  0% avahi-daemon: running [Puma.local]
13   107     1 root    S     2952  0%  0% /sbin/udevd -d
14   460     1 dbus    S     2820  0%  0% dbus-daemon --system
15   527     1 root    S     2496  0%  0% /usr/sbin/fcgiwrap -f -s unix:/run/fcg
16     1     0 root    S     2372  0%  0% init
17   588     1 root    S     2372  0%  0% -/bin/sh
18   100     1 root    S     2372  0%  0% /sbin/klogd -n
19    97     1 root    S     2372  0%  0% /sbin/syslogd -n
20   660   588 root    R     2372  0%  0% top
21   579     1 root    S     2372  0%  0% {start_rknn.sh} /bin/sh /usr/bin/start
22   523     1 root    S     2232  0%  0% /usr/sbin/dropbear -R
23   587     1 root    S     1736  0%  0% input-event-daemon -v /dev/input/event
24     9     2 root    SW        0  0%  0% [ksoftirqd/0]
25 [  4]   6.00-7.00 sec  114 MBytes  957 Mbits/sec  7473
26 [  4]   7.00-8.00 sec  114 MBytes  957 Mbits/sec  7474
27 [  4]   8.00-9.00 sec  114 MBytes  957 Mbits/sec  7473

```

从以上测试看出 USO 开启后，CPU idle 时间增加，packet size 长度越长，idle 百分比增加越多。

## 4 Jumbro frame 测试

mtu: 9000

```

1 <pre>[root@Puma:/]# ping -s 9000 192.168.1.100
2 PING 192.168.1.100 (192.168.1.100) 9000(9028) bytes of data.
3 9008 bytes from 192.168.1.100: icmp_seq=1 ttl=64 time=0.784 ms
4 9008 bytes from 192.168.1.100: icmp_seq=2 ttl=64 time=0.675 ms
5 9008 bytes from 192.168.1.100: icmp_seq=3 ttl=64 time=0.666 ms
6 9008 bytes from 192.168.1.100: icmp_seq=4 ttl=64 time=0.656 ms
7 9008 bytes from 192.168.1.100: icmp_seq=5 ttl=64 time=0.677 ms
8 9008 bytes from 192.168.1.100: icmp_seq=6 ttl=64 time=0.637 ms
9 9008 bytes from 192.168.1.100: icmp_seq=7 ttl=64 time=0.641 ms
10 9008 bytes from 192.168.1.100: icmp_seq=8 ttl=64 time=0.692 ms
11 9008 bytes from 192.168.1.100: icmp_seq=9 ttl=64 time=0.656 ms

```

## 5 PTP1588 测试

patch for ptp



1 <https://10.10.10.29/c/rk/kernel/+98577>

## 5.1 PC master and RV1126 slave

```
1 david@thinkpad-p51:~/work/develop-4.19/kernel$ sudo ptp4l -i enp0s31f6 -m -H
2 ptp4l[1790161.443]: selected /dev/ptp0 as PTP clock
3 ptp4l[1790161.443]: port 1: INITIALIZING to LISTENING on INIT_COMPLETE
4 ptp4l[1790161.443]: port 0: INITIALIZING to LISTENING on INIT_COMPLETE
5 ptp4l[1790168.489]: port 1: LISTENING to MASTER on ANNOUNCE_RECEIPT_TIMEOUT_EXPIRES
6 ptp4l[1790168.489]: selected local clock 54e1ad.ffff.dfa454 as best master
7 ptp4l[1790168.490]: assuming the grand master role
```

```

1 [root@Puma:/]# ptp4l -i eth0 -m -H -s
2 ptp4l[39.868]: selected /dev/ptp0 as PTP clock
3 [ 39.871092] rk_gmac-dwmac ffc40000.ethernet eth0: stmmac_hwtstamp_set config flags:0x0,
tx_type:0x1, rx_filter:0xc
4 [ 39.872029] stmmac_hwtstamp_set, value: 0x17e03
5 ptp4l[39.870]: port 1: INITIALIZING to LISTENING on INIT_COMPLETE
6 ptp4l[39.871]: port 0: INITIALIZING to LISTENING on INIT_COMPLETE
7 ptp4l[41.251]: port 1: new foreign master 54e1ad.ffff.dfa454-1
8 [ 43.817340] rk_gmac-dwmac ffc40000.ethernet eth0: stmmac_hwtstamp_set config flags:0x0,
tx_type:0x1, rx_filter:0xc
9 [ 43.818262] stmmac_hwtstamp_set, value: 0x17e03
10 ptp4l[45.251]: selected best master clock 54e1ad.ffff.dfa454
11 ptp4l[45.251]: port 1: LISTENING to UNCALIBRATED on RS_SLAVE
12 ptp4l[49.251]: master offset -1608 s0 freq +0 path delay 5691
13 ptp4l[50.251]: master offset -5579 s0 freq +0 path delay 9435
14 ptp4l[51.251]: master offset -4831 s2 freq +748 path delay 9435
15 ptp4l[51.251]: port 1: UNCALIBRATED to SLAVE on MASTER_CLOCK_SELECTED
16 ptp4l[52.251]: master offset 12189 s2 freq +12937 path delay 7563
17 ptp4l[53.251]: master offset 14413 s2 freq +18818 path delay 8287
18 ptp4l[54.251]: master offset 10712 s2 freq +19441 path delay 8861
19 ptp4l[55.251]: master offset 7185 s2 freq +19127 path delay 8861
20 ptp4l[56.251]: master offset 3234 s2 freq +17332 path delay 9435
21 ptp4l[57.251]: master offset 1787 s2 freq +16855 path delay 9454
22 ptp4l[58.251]: master offset 785 s2 freq +16389 path delay 9454
23 ptp4l[59.251]: master offset 89 s2 freq +15928 path delay 9473
24 ptp4l[60.251]: master offset 31 s2 freq +15897 path delay 9454
25 ptp4l[61.251]: master offset -71 s2 freq +15804 path delay 9454
26 ptp4l[62.251]: master offset -100 s2 freq +15754 path delay 9406
27 ptp4l[63.251]: master offset -27 s2 freq +15797 path delay 9406
28 ptp4l[64.251]: master offset -69 s2 freq +15747 path delay 9395
29 ptp4l[65.251]: master offset 29 s2 freq +15824 path delay 9395
30 ptp4l[66.251]: master offset -73 s2 freq +15731 path delay 9395
31 ptp4l[67.251]: master offset 32 s2 freq +15814 path delay 9388
32 ptp4l[68.251]: master offset -20 s2 freq +15772 path delay 9388
33 ptp4l[69.251]: master offset -104 s2 freq +15682 path delay 9395
34 ptp4l[70.251]: master offset -56 s2 freq +15699 path delay 9395
35 ptp4l[71.251]: master offset 24 s2 freq +15762 path delay 9388
36 ptp4l[72.251]: master offset 11 s2 freq +15756 path delay 9374
37 ptp4l[73.251]: master offset -13 s2 freq +15735 path delay 9371
38 ptp4l[74.251]: master offset -47 s2 freq +15697 path delay 9378
39 ptp4l[75.252]: master offset 26 s2 freq +15756 path delay 9378
40 ptp4l[76.252]: master offset 21 s2 freq +15759 path delay 9381
41 ptp4l[77.252]: master offset -32 s2 freq +15712 path delay 9381
42 ptp4l[78.252]: master offset -23 s2 freq +15712 path delay 9370
43 ptp4l[79.252]: master offset -25 s2 freq +15703 path delay 9370
44 ptp4l[80.252]: master offset 48 s2 freq +15768 path delay 9370
45 ptp4l[81.252]: master offset -79 s2 freq +15656 path delay 9370
46 ptp4l[82.252]: master offset -31 s2 freq +15680 path delay 9370
47 ptp4l[83.252]: master offset -88 s2 freq +15614 path delay 9375
48 ptp4l[84.252]: master offset 10 s2 freq +15685 path delay 9375
49 ptp4l[85.252]: master offset 62 s2 freq +15740 path delay 9371
50 ptp4l[86.252]: master offset -65 s2 freq +15632 path delay 9371
51 ptp4l[87.252]: master offset -11 s2 freq +15666 path delay 9365

```

52	ptp4l[88.252]: master offset	-15	s2	freq	+15659	path delay	9366
53	ptp4l[89.252]: master offset	58	s2	freq	+15728	path delay	9366
54	ptp4l[90.252]: master offset	1	s2	freq	+15688	path delay	9371
55	ptp4l[91.252]: master offset	-48	s2	freq	+15639	path delay	9393
56	ptp4l[92.252]: master offset	-76	s2	freq	+15597	path delay	9394
57	ptp4l[93.252]: master offset	-23	s2	freq	+15627	path delay	9389
58	ptp4l[94.252]: master offset	0	s2	freq	+15643	path delay	9389
59	ptp4l[95.252]: master offset	34	s2	freq	+15677	path delay	9403
60	ptp4l[96.252]: master offset	7	s2	freq	+15660	path delay	9403
61	ptp4l[97.252]: master offset	-79	s2	freq	+15577	path delay	9412
62	ptp4l[98.252]: master offset	2	s2	freq	+15634	path delay	9403
63	ptp4l[99.252]: master offset	11	s2	freq	+15643	path delay	9392
64	ptp4l[100.252]: master offset	9	s2	freq	+15645	path delay	9392
65	ptp4l[101.252]: master offset	13	s2	freq	+15651	path delay	9386
66	ptp4l[102.252]: master offset	-18	s2	freq	+15624	path delay	9390
67	ptp4l[103.252]: master offset	30	s2	freq	+15667	path delay	9390
68	ptp4l[104.252]: master offset	82	s2	freq	+15728	path delay	9386
69	ptp4l[105.252]: master offset	-45	s2	freq	+15626	path delay	9386

## 5.1 RV1126 master and PC slave

```

1 [root@Puma:/]# ptp4l -i eth0 -m -H
2 ptp4l[15.668]: selected /dev/ptp0 as PTP clock
3 ptp4l[15.670]: port 1: INITIALIZING to LISTENING on INIT_COMPLETE
4 ptp4l[15.670]: port 0: INITIALIZING to LISTENING on INIT_COMPLETE
5 ptp4l[22.120]: port 1: LISTENING to MASTER on ANNOUNCE_RECEIPT_TIMEOUT_EXPIRES
6 ptp4l[22.120]: selected local clock aadc46.ffffe.5da6d9 as best master
7 ptp4l[22.121]: assuming the grand master role

```

```

1 david@thinkpad-p51:~/work/linuxptp/linuxptp$ sudo ptp4l -i enp0s31f6 -m -H -s
2 ptp4l[1879661.603]: selected /dev/ptp0 as PTP clock
3 ptp4l[1879661.603]: port 1: INITIALIZING to LISTENING on INIT_COMPLETE
4 ptp4l[1879661.603]: port 0: INITIALIZING to LISTENING on INIT_COMPLETE
5 ptp4l[1879662.249]: port 1: new foreign master aadc46.ffffe.5da6d9-1
6 ptp4l[1879665.849]: selected best master clock aadc46.ffffe.5da6d9
7 ptp4l[1879665.849]: port 1: LISTENING to UNCALIBRATED on RS_SLAVE
8 ptp4l[1879667.649]: master offset          49 s0 freq   -9515 path delay    9364
9 ptp4l[1879668.549]: master offset          128 s2 freq   -9436 path delay    9338
10 ptp4l[1879668.549]: port 1: UNCALIBRATED to SLAVE on MASTER_CLOCK_SELECTED
11 ptp4l[1879669.449]: master offset          256 s2 freq   -9180 path delay    9338
12 ptp4l[1879670.349]: master offset         -230 s2 freq   -9589 path delay    9338
13 ptp4l[1879671.249]: master offset         -399 s2 freq   -9827 path delay    9360
14 ptp4l[1879672.149]: master offset          142 s2 freq   -9406 path delay    9360
15 ptp4l[1879673.049]: master offset          232 s2 freq   -9273 path delay    9347
16 ptp4l[1879673.949]: master offset         -303 s2 freq   -9739 path delay    9347
17 ptp4l[1879674.849]: master offset         -267 s2 freq   -9794 path delay    9338
18 ptp4l[1879675.749]: master offset          327 s2 freq   -9280 path delay    9335
19 ptp4l[1879676.649]: master offset          405 s2 freq   -9104 path delay    9335
20 ptp4l[1879677.549]: master offset         -156 s2 freq   -9543 path delay    9335
21 ptp4l[1879678.449]: master offset         -178 s2 freq   -9612 path delay    9335
22 ptp4l[1879679.349]: master offset        -100 s2 freq   -9587 path delay    9335
23 ptp4l[1879680.249]: master offset          -73 s2 freq   -9590 path delay    9335
24 ptp4l[1879681.149]: master offset          -79 s2 freq   -9618 path delay    9344
25 ptp4l[1879682.049]: master offset          -76 s2 freq   -9639 path delay    9344
26 ptp4l[1879682.949]: master offset          -59 s2 freq   -9645 path delay    9329
27 ptp4l[1879683.849]: master offset          -31 s2 freq   -9634 path delay    9329
28 ptp4l[1879684.750]: master offset           22 s2 freq   -9591 path delay    9329
29 ptp4l[1879685.650]: master offset           -9 s2 freq   -9615 path delay    9337
30 ptp4l[1879686.550]: master offset          -31 s2 freq   -9640 path delay    9337
31 ptp4l[1879687.450]: master offset           -3 s2 freq   -9621 path delay    9337
32 ptp4l[1879688.350]: master offset          -15 s2 freq   -9634 path delay    9351
33 ptp4l[1879689.250]: master offset          113 s2 freq   -9511 path delay    9351
34 ptp4l[1879690.150]: master offset          115 s2 freq   -9475 path delay    9351
35 ptp4l[1879691.050]: master offset           43 s2 freq   -9512 path delay    9351
36 ptp4l[1879691.950]: master offset          124 s2 freq   -9418 path delay    9348
37 ptp4l[1879692.850]: master offset          137 s2 freq   -9368 path delay    9337
38 ptp4l[1879693.750]: master offset          268 s2 freq   -9196 path delay    9334
39 ptp4l[1879694.650]: master offset         -342 s2 freq   -9726 path delay    9334
40 ptp4l[1879695.550]: master offset         -162 s2 freq   -9648 path delay    9331
41 ptp4l[1879696.450]: master offset         -284 s2 freq   -9819 path delay    9331
42 ptp4l[1879697.350]: master offset          421 s2 freq   -9199 path delay    9317
43 ptp4l[1879698.250]: master offset          -92 s2 freq   -9586 path delay    9319
44 ptp4l[1879699.150]: master offset         -139 s2 freq   -9660 path delay    9319
45 ptp4l[1879700.050]: master offset          -67 s2 freq   -9630 path delay    9324
46 ptp4l[1879700.950]: master offset          -59 s2 freq   -9642 path delay    9319
47 ptp4l[1879701.850]: master offset          -81 s2 freq   -9682 path delay    9319
48 ptp4l[1879702.750]: master offset           -8 s2 freq   -9633 path delay    9324
49 ptp4l[1879703.650]: master offset           14 s2 freq   -9613 path delay    9329
50 ptp4l[1879704.550]: master offset           17 s2 freq   -9606 path delay    9329
51 ptp4l[1879705.450]: master offset           76 s2 freq   -9542 path delay    9323
52 ptp4l[1879706.350]: master offset          220 s2 freq   -9375 path delay    9331
53 ptp4l[1879707.250]: master offset          123 s2 freq   -9406 path delay    9331

```

