

[PATCH 1/1 net-next] net: fec: enable pause frame to improve rx performance for 1G network

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The limitation of imx6 internal bus cause fec can't achieve 1G performance.
There will be many packages lost because FIFO over run.

This patch enable pause frame flow control.

Before this patch

```
iperf -s -i 1
```

```
TCP window size: 85.3 KByte (default)
```

```
-----  
[ 4] local 10.192.242.153 port 5001 connected with 10.192.242.94 port 49773  
[ ID] Interval      Transfer      Bandwidth  
[ 4] 0.0- 1.0 sec  6.35 MBytes  53.3 Mbits/sec  
[ 4] 1.0- 2.0 sec  3.39 MBytes  28.5 Mbits/sec  
[ 4] 2.0- 3.0 sec  2.63 MBytes  22.1 Mbits/sec  
[ 4] 3.0- 4.0 sec  1.10 MBytes   9.23 Mbits/sec
```

```
ifconfig
```

```
RX packets:46195 errors:1859 dropped:1 overruns:1859 frame:1859
```

After this patch

```
iperf -s -i 1
```

```
[ 4] local 10.192.242.153 port 5001 connected with 10.192.242.94 port 49757  
[ ID] Interval      Transfer      Bandwidth  
[ 4] 0.0- 1.0 sec  49.8 MBytes  418 Mbits/sec  
[ 4] 1.0- 2.0 sec  50.1 MBytes  420 Mbits/sec  
[ 4] 2.0- 3.0 sec  47.5 MBytes  399 Mbits/sec  
[ 4] 3.0- 4.0 sec  45.9 MBytes  385 Mbits/sec  
[ 4] 4.0- 5.0 sec  44.8 MBytes  376 Mbits/sec
```

```
ifconfig
```

```
RX packets:2348454 errors:0 dropped:16 overruns:0 frame:0
```

```
Signed-off-by: Frank Li <Frank.Li at freescale.com>
```

```
Signed-off-by: Fugang Duan <B38611 at freescale.com>
```

```
---  
drivers/net/ethernet/freescale/fec.c | 26 +++++  
drivers/net/ethernet/freescale/fec.h | 4 +++  
2 files changed, 30 insertions(+), 0 deletions(-)
```

```
diff --git a/drivers/net/ethernet/freescale/fec.c b/drivers/net/ethernet/freescale/fec.c
```

```
index 6dc2094..4928260 100644
```

```
--- a/drivers/net/ethernet/freescale/fec.c
```

```
+++ b/drivers/net/ethernet/freescale/fec.c
```

```
@@ -68,6 +68,14 @@
```

```
#define DRIVER_NAME "fec"
```

```

+/* Pause frame feild and FIFO threshold */
+#define FEC_ENET_FCE    (1 << 5)
+#define FEC_ENET_RSEM_V    0x84
+#define FEC_ENET_RSFL_V    16
+#define FEC_ENET_RAEM_V    0x8
+#define FEC_ENET_RAFL_V    0x8
+#define FEC_ENET_OPD_V 0xFFFO
+
+/* Controller is ENET-MAC */
+#define FEC_QUIRK_ENET_MAC    (1 << 0)
+/* Controller needs driver to swap frame */
@@ -470,6 +478,21 @@ fec_restart(struct net_device *ndev, int duplex)
+    }
+}
+
+}
+
+/* enable pause frame*/
+if (id_entry->driver_data & FEC_QUIRK_HAS_GBIT) {
+    rcntl |= FEC_ENET_FCE;
+
+    /* set FIFO thresh hold parameter to reduce overrun */
+    writel(FEC_ENET_RSEM_V, fep->hwp + FEC_R_FIFO_RSEM);
+    writel(FEC_ENET_RSFL_V, fep->hwp + FEC_R_FIFO_RSFL);
+    writel(FEC_ENET_RAEM_V, fep->hwp + FEC_R_FIFO_RAEM);
+    writel(FEC_ENET_RAFL_V, fep->hwp + FEC_R_FIFO_RAFL);
+
+    /* OPD */
+    writel(FEC_ENET_OPD_V, fep->hwp + FEC_OPD);
+}
+
+    writel(rcntl, fep->hwp + FEC_R_CNTRL);
+
+    if (id_entry->driver_data & FEC_QUIRK_ENET_MAC) {
@@ -1021,6 +1044,9 @@ static int fec_enet_mii_probe(struct net_device *ndev)
+    else
+        phy_dev->supported &= PHY_BASIC_FEATURES;
+
+    /* enable phy pause frame for any platform */
+    phy_dev->supported |= ADVERTISED_Pause;
+
+    phy_dev->advertising = phy_dev->supported;
+
+    fep->phy_dev = phy_dev;
diff --git a/drivers/net/ethernet/freescale/fec.h b/drivers/net/ethernet/freescale/fec.h
index 4862394..7dac581 100644
--- a/drivers/net/ethernet/freescale/fec.h
+++ b/drivers/net/ethernet/freescale/fec.h
@@ -48,6 +48,10 @@
+#define FEC_R_DES_START    0x180 /* Receive descriptor ring */
+#define FEC_X_DES_START    0x184 /* Transmit descriptor ring */
+#define FEC_R_BUFF_SIZE    0x188 /* Maximum receive buff size */
+#define FEC_R_FIFO_RSFL    0x190 /* Receive FIFO section full threshold */
+#define FEC_R_FIFO_RSEM    0x194 /* Receive FIFO section empty threshold */
+#define FEC_R_FIFO_RAEM    0x198 /* Receive FIFO almost empty threshold */
+#define FEC_R_FIFO_RAFL    0x19c /* Receive FIFO almost full threshold */
+#define FEC_MII_GSK_CFGR    0x300 /* MII_GSK Configuration reg */
+#define FEC_MII_GSK_ENR    0x308 /* MII_GSK Enable reg */

```

1.7.1

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