Design Document for Ether / L2 Switch Driver

1　Outline

This document describes the Ethernet/L2 Switch driver in Linux kernel of MVF TOWER BOARD (XTWR-VF600) with MVF SoC.

2　Existing code to be changed

2.1　Source

- Ether driver
  i.MX 6Solo SABRE-A BSP
  drivers/net/fec.c / fec.h
  drivers/net/fec_1588.c / fec_1588.h
  arm/arm/plat-mxc/devices/platfor-fec.c
  arch/arm/mach-mx6/mx6_fec.c

- L2 Switch driver
  Modelo BSP
  drivers/net/modelo_switch.c / modelo_switch.h
  arch/m68k/coldfire/m5441x/l2switch.c
  arch/m68k/include/asm/mcfsiwtch.h
  include/linux/fsl_devices.h

2.2　Modifications

- Ether driver
  drivers/net/fec.c/fec.h

  1. No register setting for GIGA BIT of FEC
     Set conditional compilation and do not build with MVF. Use ifndef and make the following change.
     if (fep->phy_dev && (fep->phy_dev->supported &
     　　(SUPPORTED_1000baseT_Half | SUPPORTED_1000baseT_Full)) &&
     　　fep->phy_interface == PHY_INTERFACE_MODE_RGMII &&
     　　fep->phy_dev->speed == SPEED_1000)

val |= (0x1 << 5)

to

#ifndef CONFIG_ARCH_MVF

if (fep->phy_dev && (fep->phy_dev->supported &

    (SUPPORTED_1000baseT_Half | SUPPORTED_1000baseT_Full)) &&

    fep->phy_interface == PHY_INTERFACE_MODE_RGMII &&

    fep->phy_dev->speed == SPEED_1000)

    val |= (0x1 << 5)

#endif

2. Add conditional compilation for IEEE1588

Adjust to be the same conditional compilation as CONFIG_ARCH_MX6 when IEEE1588 is enabled.

Within fec_restart function

#if defined(CONFIG_SOC_IMX28) || defined(CONFIG_ARCH_MX6) → #if defined(CONFIG_SOC_IMX28) || defined(CONFIG_ARCH_MX6) || defined(CONFIG_ARCH_MVF)

* Supporting EN1588bit Enable

drivers/net/fec_1588.c / fec_1588.h

1. Adjust to be the same conditional compilation as CONFIG_ARCH_MX6.

defined(CONFIG_ARCH_MX6) ->

defined(CONFIG_ARCH_MX6) || defined(CONFIG_ARCH_MVF)

arm/arm/plat-mxc/devices/platfor-fec.c

1. Add resource definition as below

#ifdef CONFIG_ARCH MVF

const struct imx_fec_data mvf_fec_data __initconst =

    imx_fec_data_entry_single(MVF);

#endif

Define below (to be macro extended) in system header.

MVF_FEC_BASE_ADDR: Base address

MVF_INT_FEC: Interrupt number (ENET_MAC0)

arm/arm/mach-mvf/mvf_fec.c

1. Define initialization of FEC resource

   Add resource initialization same as arch/arm/mach-mx6/mx6_fec.c.

   Also add an entry so that below will be called at the board initialization.

   void __init mvf_init_fec(struct fec_platform_data fec_data)

■ L2 Switch driver

Two files below have implementation to directly change register.

Therefore with MVF, it is adjusted that such is done after ioremap. Also, adopt

the porting that makes minimum change in source code.

arch/mach-mvf/mvf_l2switch.c (TBA)

1. Port resource definitions from Modelo BSP to MVF BSP.

   Replace all the name "coldfire" in the file (except indicate the file source) with MVF.

2. Set up as follows.

   Do not use this file for GPIO settings.

   For direct reference of register, adjust to use an address after ioremap.

   Define FEC address and Switch address with platform struct of this file.

drivers/net/modelo_switch.c / modelo_switch.h

1. Port from Modelo BSP to MVF BSP.

2. Set up as follows.

   Ioremap each IP address defined by Platform struct and modify to use
   such addresses. (FEC IP/Switch IP/Address Table)

   Modify Tx/rx/open/close to the struct that supports net_device_ops.

   Write new register.

   Integrate definitions dispersed in drivers/net/modelo_switch.h and
   arch/m68k/include/asm/mcfsiwtch.h.

include/linux/fsl_devices.h

1. Add platform struct for Switch

3 API of new functions

No newly added API since FEC(including 1588 support)/L2 Switch Driver is divert source.

4 Expected register settings

4.1 Ether Driver

CPU manual 6.1 indicates that Ethernet(RMII_CLK) is 50MHz, and according to the Table31-10 of the manual, set MII_SPEED Field of ENET_MSCR as 0x9.

* However, fec.c of BSP has the following and it may not be 0x9 due to a bug.

fep->phy_speed=DIV_ROUND_UP(clk_get_rate(fep->clk),

(FEC_ENET_MII_CLK << 2)) << 1;

5 Expected functionality and usage

L2Switch driver complies with the format of modelo_switch command.

6 Any other pertinent information

None