rckemac.c : Resolving Linux Dependencies

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NAPI (New API)

- For high-bandwidth systems, interrupts can be overwhelming
- Alternative interface based on **polling**
- Upon receiving a packet RX interrupt
  - Should not process that packet
  - Disable further interrupts
  - Tell the kernel to start polling (netif_rx_schedule)
- netif_rx_schedule causes the device's poll method to be called later
- 2 options
  - Polling & NAPI Interrupt
  - Polling only

Linux Dependencies in rckemac.c

- emac_interrupt()
  - set_lapic_mask()
  - netif_rx_schedule()
- emac_clear_interrupt()
  - unset_lapic_mask()
- emac_poll()
  - netif_rx_complete()
- emac_open()
  - netif_start_queue()
- emac_stop()
  - netif_stop_queue()
- emac_rx()
  - netif_rx()
- emac_tx_timeout()
  - netif_wake_queue()

emac_interrupt()

- set_lapic_mask(EMAC_LVT, dev->irq)
  - Disable further interrupts
- netif_rx_schedule(dev)
  - Tell the kernel to start polling

Dependencies: set_lapic_mask()

- drivers/net/rckemac.h
  - EMAC_LVT -> APIC_LVT0, APIC_LVT1
- include/asm/apicdef.h
  - APIC_LVT, APIC_LVT1
- include/asm/mach-mcemu/mach_apic.h
  - set_lapic_mask() -> apic_read(), apic_write_around()
- include/asm/apic.h
  - apic_read() -> APIC_BASE
  - apic_write_around() -> apic_write(), apic_write_atomic() -> APIC_BASE
  - apic_write_atomic() -> xchg()
- include/asm/apicdef.h
  - APIC_BASE -> fix_to_virt(), FIX_APIC_BASE

Dependencies: set_lapic_mask()

- include/asm/fixmap.h
  - FIX_APIC_BASE
  - fix_to_virt() -> __fix_to_virt() -> PAGE_SHIFT
- include/asm/page.h
  - PAGE_SHIFT
- include/asm/system.h
  - xchg()

Dependencies: netif_rx_schedule()

- include/linux/netdevice.h
  - netif_rx_schedule_prep() -> netif_running(), __netif_rx_schedule_prep()
  - netif_running() -> test_bit()
  - __netif_rx_schedule_prep() -> test_and_set_bit()
  - __netif_rx_schedule() -> local_irq_save(), dev_hold(), list_add_tail(), __raise_softirq_irqoff(), local_irq_restore()
- include/asm/bitops.h
  - test_bit()
  - test_and_set_bit()
- include/asm/atomic.h
  - dev_hold()

Dependencies: netif_rx_schedule()

- include/linux/list.h
  - list_add_tail()
- include/linux/interrupt.h
  - __raise_softirq_irqoff()
- include/linux/system.h
  - local_irq_save()
  - local_irq_restore()

emac_clear_interrupt()

- unset_lapic_mask(EMAC_LVT, dev->irq)
  - Allow interrupts to occur
  - Same dependency as set_lapic_mask()

emac_poll()

- netif_rx_complete()
  - Tell the kernel that polling is done

Dependencies: netif_rx_complete()

- include/linux/netdevice.h
  - netif_rx_complete() -> local_irq_save(), BUG_ON(), list_del(), smp_mb__before_clear_bit(), clear_bit(), local_irq_restore()
- include/asm/system.h
  - local_irq_save()
  - local_irq_restore()
- include/asm-generic/bug.h
  - BUG_ON()

Dependencies: netif_rx_complete()

- include/linux/list.h
  - list_del()
- include/asm/bitops.h
  - smp_mb__before_clear_bit()
  - clear_bit()

emac_open()

- netif_start_queue()
  - Tell the kernel to start network queue

Dependencies: netif_start_queue()

- include/linux/netdevice.h
  - netif_start_queue() -> clear_bit()
- include/asm/bitops.h
  - clear_bit()

emac_stop()

- netif_stop_queue()
  - Tell the kernel to stop network queue

Dependencies: netif_stop_queue()

- include/linux/netdevice.h
  - netif_stop_queue() -> set_bit()
- include/asm/bitops.h
  - set_bit()

emac_rx()

- netif_rx()
  - Process the skb for upper layers
  - Defined in /net/core/dev.c

emac_tx_timeout()

- netif_wake_queue()
  - Tell the kernel to wake the queue

Dependencies: netif_wake_queue()

- include/linux/netdevice.h
  - netif_wake_queue() -> test_and_clear_bit(), __netif_schedule()
  - __netif_schedule() -> local_irq_save(), raise_softirq_irqoff(), local_irq_restore()
- include/asm/bitops.h
  - test_and_clear_bit()
- include/linux/interrupt.h
  - __raise_softirq_irqoff()
- include/linux/system.h
  - local_irq_save()
  - local_irq_restore()