## JACK SENSE代码流程

1. **主动事件注册**

hdac\_bus.c

snd\_hdac\_bus\_init() {

//注册主动事件

INIT\_WORK(&bus->unsol\_work,snd\_hdac\_bus\_process\_unsol\_events);

}

snd\_hdac\_bus\_process\_unsol\_events()

{

    while (bus->unsol\_rp != bus->unsol\_wp) {

        if (drv->unsol\_event)

            drv->unsol\_event(codec, res);

    }

}

patch\_conexant.c

static const struct hda\_codec\_ops cx\_auto\_patch\_ops = {

    .unsol\_event = snd\_hda\_jack\_unsol\_event,

};

hda\_jack.c

void snd\_hda\_jack\_unsol\_event()

{

    call\_jack\_callback(codec, res, event);

    snd\_hda\_jack\_report\_sync(codec);

}

1. **主动事件回调处理函数**

hda\_generic.h

回调函数实现：

/\* standard jack event callbacks \*/

void snd\_hda\_gen\_hp\_automute(struct hda\_codec \*codec,

struct hda\_jack\_callback \*jack); //耳机自动静音

void snd\_hda\_gen\_line\_automute(struct hda\_codec \*codec,

struct hda\_jack\_callback \*jack); //外放自动静音

void snd\_hda\_gen\_mic\_autoswitch(struct hda\_codec \*codec,

  struct hda\_jack\_callback \*jack); //MIC自动切换

回调函数注册：

check\_auto\_mute\_availability(codec);//耳机和外放自动静音回调函数注册

check\_auto\_mic\_availability(codec); //MIC自动切换回调函数注册

1. **主动事件调用**

hda\_controller.c

Codec芯片JSense管脚产生中断，调用如下函数：

irqreturn\_t azx\_interrupt(int irq, void \*dev\_id){

snd\_hdac\_bus\_update\_rirb(bus);  //接受RIRB条目

}

snd\_hdac\_bus\_update\_rirb()

{

  snd\_hdac\_bus\_queue\_event(bus, res, res\_ex);

}

snd\_hdac\_bus\_queue\_event()

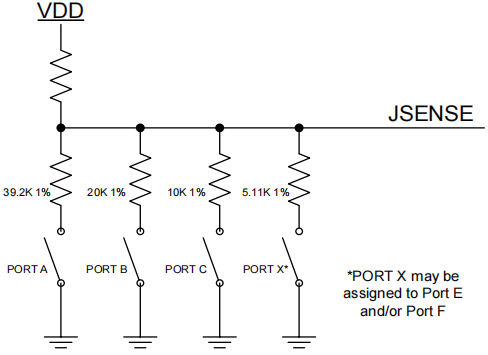
{

  schedule\_work(&bus->unsol\_work);    //处理主动事件

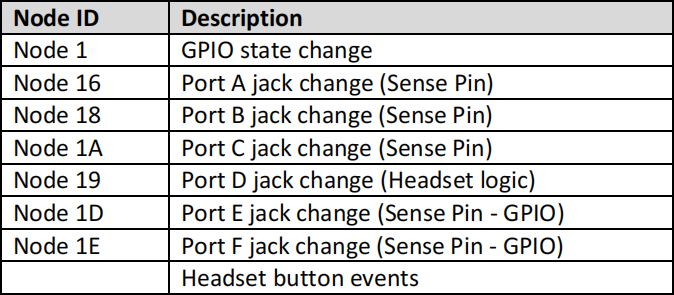
}

1. **JSense中断产生**

芯片电路实现：



AFG中定义的主动上报消息源，当源状态改变时，芯片主动上报消息：



1. **中断分析**

插拔耳机孔，查看中断trace信息如下：

root@E490-2:/sys/kernel/debug/tracing# cat trace

# tracer: nop

#

# entries-in-buffer/entries-written: 2/2   #P:8

#

#                                \_-----=> irqs-off

#                               / \_----=> need-resched

#                              | / \_---=> hardirq/softirq

#                              || / \_--=> preempt-depth

#                              ||| /     delay

#           TASK-PID     CPU#  ||||   TIMESTAMP  FUNCTION

#              | |         |   ||||      |         |

          <idle>-0       [007] d.h. 60822.084078: hda\_unsol\_event: [0000:00:1f.3:0] res=0x04000000, res\_ex=0x00000010

          <idle>-0       [007] d.h. 60822.624109: hda\_unsol\_event: [0000:00:1f.3:0] res=0x08000000, res\_ex=0x00000010

（1）00:1f.3表示音频PCI设备

root@E490-2:/sys/kernel/debug/tracing# lspci

00:1f.3 Audio device: Intel Corporation Cannon Point-LP High Definition Audio Controller (rev 30)

1. 参数res解析

根据HDA 7.3.3.14 Unsolicited Response章节，res右移26位表示tag。即0x04000000对应的tag为1，0x08000000对应的tag为2。查看如下codec信息，即可得知，分别对应codec的0x16和0x19。

root@E490-2:/# cat /proc/asound/card0/codec#0

Node 0x16 [Pin Complex] wcaps 0x400581: Stereo

  Pincap 0x0001001c: OUT HP EAPD Detect

  EAPD 0x2: EAPD

  Pin Default 0x03211040: [Jack] HP Out at Ext Left

    Conn = 1/8, Color = Black

    DefAssociation = 0x4, Sequence = 0x0

  Pin-ctls: 0xc0: OUT HP

  Unsolicited: tag=01, enabled=1

  Power states:  D0 D1 D2 D3 EPSS

  Power: setting=D0, actual=D0

  Connection: 2

     0x10\* 0x11

Node 0x19 [Pin Complex] wcaps 0x40048b: Stereo Amp-In

  Control: name="Mic Boost Volume", index=0, device=0

    ControlAmp: chs=3, dir=In, idx=0, ofs=0

  Amp-In caps: ofs=0x00, nsteps=0x03, stepsize=0x2f, mute=0

  Amp-In vals:  [0x00 0x00]

  Pincap 0x00001324: IN Detect

    Vref caps: HIZ 50 80

  Pin Default 0x03a11030: [Jack] Mic at Ext Left

    Conn = 1/8, Color = Black

    DefAssociation = 0x3, Sequence = 0x0

  Pin-ctls: 0x24: IN VREF\_80

  Unsolicited: tag=02, enabled=1

  Power states:  D0 D1 D2 D3 EPSS

  Power: setting=D0, actual=D0

1. 结论：插拔耳机孔，JSENSE管脚产生中断，CODEC向controller发送0x16和0x19的主动上报事件。