Embedded System Design Lab 5

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cross compile madplay 需要的 library

cross compile zlib

- 解壓縮並 configure ‘compile shared link 格式’ 和 ‘輸出位置’

```
tar zxvf zlib-1.2.3.tar.gz

mkdir /usr/local/mymadplay/zlib-1.2.3

./configure -shared --prefix=/usr/local/mymadplay/zlib-1.2.3
```

- 修改 Makefile

```
CC = arm-linux-gnueabihf-gcc
LDSHARED=arm-linux-gnueabihf-gcc -shared -Wl,-soname,libz.so.1
CPP=arm-linux-gnueabihf-gcc -E
AR=arm-linux-gnueabihf-ar rc
RANLIB=arm-linux-gnueabihf-ranlib
```

- compile

```
make
make install
```

cross compile libid3tag

- 解壓縮並 configure ‘cross compile gcc’, ‘zlib lib 位置’ 和 ‘輸出位置’

```
tar zxvf libid3tag-0.15.1b.tar.gz

./configure --prefix=/usr/local/madplay-source/libid3tag \
CC=arm-linux-gnueabihf-gcc \
--host=arm-linux-gnueabihf \
CPPFLAGS=-I/usr/local/mymadplay/zlib-1.2.3/include/ \
LDFLAGS=-L/usr/local/mymadplay/zlib-1.2.3/lib/
```

- compile

```
make
make install
```

cross compile libmad

- 解壓縮並 configure ‘cross compile gcc’, ‘libid3tag lib 位置’ 和 ‘輸出位置’

```
tar zxvf libmad-0.15.1b.tar.gz

./configure --prefix=/usr/local/madplay-source/libmad \
CC=arm-linux-gnueabihf-gcc \
--host=arm-linux-gnueabihf \
CPPFLAGS=-I/usr/local/mymadplay/libid3tag/include/ \
LDFLAGS=-L/usr/local/mymadplay/libid3tag/lib
```

- 直接 make 會有 2 種 error
  - 第一種

```
nrecognized command line option “-fforce-mem”
```

解決辦法 :

```
sed -i '/-fforce-mem/d' configure
```

  - 第二種

```
/tmp/ccf2FxyW.s:1299: Error: selected processor does not support
Thumb mode `rsc r0,r0,#0'
/tmp/ccf2FxyW.s:1435: Error: selected processor does not support
Thumb mode `rsc r8,r8,#0'
/tmp/ccf2FxyW.s:1857: Error: selected processor does not support
Thumb mode `rsc r0,r0,#0'
/tmp/ccf2FxyW.s:1996: Error: selected processor does not support
Thumb mode `rsc r0,r0,#0
```

解決辦法 : vim fixed.h 將

```
#  define MAD_F_MLN(hi, lo)  \
    asm ("rsbs  %0, %2, #0\n\t"  \
         "rsc   %1, %3, #0"  \
         : "=r" (lo), "=r" (hi)  \
         : "0" (lo), "1" (hi)  \
         : "cc")
```

改爲

```
#ifdef __thumb__
/* In Thumb-2, the RSB-immediate instruction is only allowed with
 a zero
operand. If needed this code can also support Thumb-1
(simply append "s" to the end of the second two instructions). */
# define MAD_F_MLN(hi, lo) \
asm ("rsbs %0, %0, #0\n\t" \
"       sbc %1, %1, %1\n\t" \
```

```
            "sub %1, %1, %2" \
            : "+&r" (lo), "=&r" (hi) \
            : "r" (hi) \
            : "cc")
    #else /* ! __thumb__ */
    # define MAD_F_MLN(hi, lo) \
            asm ("rsbs %0, %2, #0\n\t" \
            "rsc %1, %3, #0" \
             : "=r" (lo), "=r" (hi) \
              : "=&r" (lo), "=r" (hi) \
              : "0" (lo), "1" (hi) \
              : "cc")
    #endif /* __thumb__ */
```

- compile

```
make
make install
```

cross compile madplay

- 解壓縮並 configure 'cross compile gcc', 'zlib, libid3tag, libmad lib 位置' 和 '輸出位置'

```
tar zxvf madplay-0.15.2b.tar.gz

./configure \
--prefix=/usr/local/mymadplay/madplay-0.15.2 \
CC=arm-linux-gnueabihf-gcc \
--host=arm-linux-gnueabihf \
CPPFLAGS="-I/usr/local/madplay-source/libid3tag/include/ \
-I/usr/local/madplay-source/libmad/include/" \
LDFLAGS="-L/usr/local/mymadplay/zlib-1.2.3/lib/ \
-L/usr/local/madplay-source/libid3tag/lib/ \
-L/usr/local/madplay-source/libmad/lib/"
```

- compile

```
make
make install
```

此步驟或產出 madplay 執行檔直接傳到板子**沒辦法**直接使用 須將 libmad.so.0.2.1 和 libid3tag.so.0.3.0 改名成 libmad.so.0 和 libid3tag.so.0 並放到板子的 /usr/lib 底下才可執行 madplay

cross compile aplay

- 到 http://www.alsa-project.org/main/index.php/Download 下載最新版本的 alsa（alsa-lib-1.0.29.tar.bz2）和 tool（alsa-utils-1.0.29.tar.bz2） ### cross compile alsa-lib

- 解壓縮並 configure ‘cross compile gcc’ 和 ‘輸出位置’

```
tar jcvf alsa-lib-1.0.29.tar.bz2
./configure \
--host=arm-linux-gnueabihf \
--prefix=/usr/local/share/arm-alsa \
--enable-shared \
--disable-python --with-configdir=/usr/local/share/alsa \
--with-plugindir=/usr/local/lib/alsa_lib
CC=arm-linux-gnueabihf-gcc C\
XX=arm-linux-gnueabihf-g++ \
LD=arm-linux-gnueabihf-ld
```

- compile

```
make
make install
```

cross compile alsa-utils

- 解壓縮並 configure ‘cross compile gcc’, ‘alsa-lib lib 位置’ 和 ‘輸出位置’

```
./configure --host=arm-linux-gnueabihf \
--prefix=/usr/local/share/arm-alsa \
CFLAGS="-I/usr/local/share/arm-alsa/include" \
LDFLAGS="-L/usr/local/share/arm-alsa/lib \
-lasound" --disable-alsamixer --disable-xmlto \
--with-alsa-inc-prefix=/usr/local/share/arm-alsa/include \
--with-alsa-prefix=/usr/local/share/arm-alsa/lib \
CC=arm-linux-gnueabihf-gcc CXX=arm-linux-gnueabihf-g++
```

- compile

```
make
make install
```

此步驟或產出 aplay 執行檔直接傳到板子即可使用

最後直接執行 madplay -o wav:- music.mp3 | aplay a.wav 即可成功

Reference -
http://www.wenqujingdian.com/Public/editor/attached/file/20180317/20180317215634_64129.pdf -
https://www.twblogs.net/a/5e6b933dbd9eee211685f17d?fbclid=IwAR1a9ZtyoccMP_94uWYMhFH4Pfvj0bOtHSotsoilit7iI1MNKFyuqptcjms -
https://www.cnblogs.com/chd-zhangbo/p/5270290.html?fbclid=IwAR0eMqh-pnridDSzIegmg2gbSVgybbrkLRBnIScBpkuRnJVj3CUPzff4Arc