Problem on compiling egl / opengl sample applications with sunxi-mali library

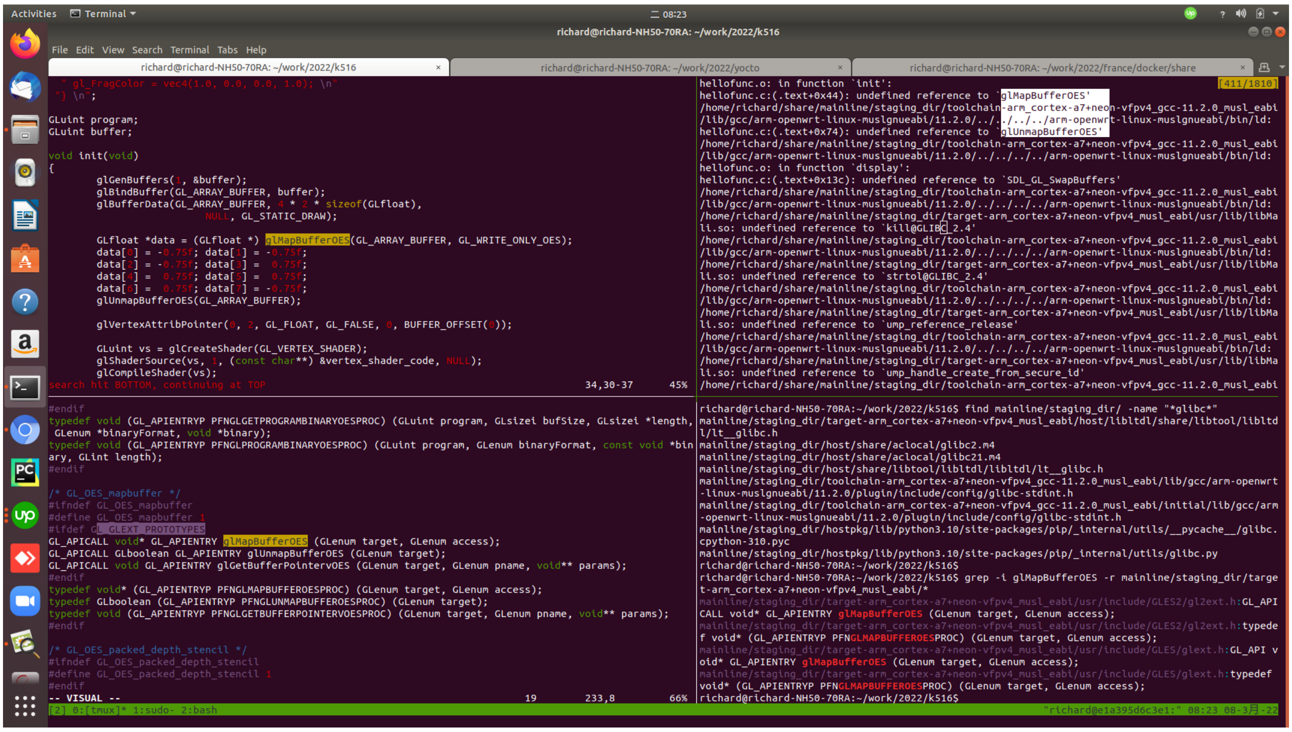
1. sunxi-mali
https://github.com/linux-sunxi/sunxi-mali.git

2. compiling opengl sample applications with sunxi-mali library

Follow below link to create a sample application.
https://people.freedesktop.org/~idr/OpenGL_tutorials/02-GLSL-hello-world.html#frag-shader

see the source file in
https://github.com/vewe-richard/openwrt-orange-pi.git
multilangs/c/hellofunc.c

compiling by command,
make V=s package/helloworld/{clean,compile}


Activities
Terminal
08:23
richard@richard-NH50-70RA: ~/work/2022/k516
File
Edit
View
Search
Terminal
Tabs
Help
richard@richard-NH50-70RA: ~/work/2022/k516
richard@richard-NH50-70RA: ~/work/2022/yocto
richard@richard-NH50-70RA: ~/work/2022/france/docker/share

```
 " gl_FragColor = vec4(1.0, 0.0, 0.0, 1.0); \n"
 "} \n";

GLuint program;
GLuint buffer;

void init(void)
{
        glGenBuffers(1, &buffer);
        glBindBuffer(GL_ARRAY_BUFFER, buffer);
        glBufferData(GL_ARRAY_BUFFER, 4 * 2 * sizeof(GLfloat),
                        NULL, GL_STATIC_DRAW);

        GLfloat *data = (GLfloat *) glMapBufferOES(GL_ARRAY_BUFFER, GL_WRITE_ONLY_OES);
        data[0] = -0.75f; data[1] = -0.75f;
        data[2] = -0.75f; data[3] =  0.75f;
        data[4] =  0.75f; data[5] =  0.75f;
        data[6] =  0.75f; data[7] = -0.75f;
        glUnmapBufferOES(GL_ARRAY_BUFFER);

        glVertexAttribPointer(0, 2, GL_FLOAT, GL_FALSE, 0, BUFFER_OFFSET(0));

        GLuint vs = glCreateShader(GL_VERTEX_SHADER);
        glShaderSource(vs, 1, (const char**) &vertex_shader_code, NULL);
        glCompileShader(vs);
search hit BOTTOM, continuing at TOP                                    34,30-37      45%
```

```
#endif
typedef void (GL_APIENTRYP PFNGLGETPROGRAMBINARYOESPROC) (GLuint program, GLsizei bufSize, GLsizei *length,
 GLenum *binaryFormat, void *binary);
typedef void (GL_APIENTRYP PFNGLPROGRAMBINARYOESPROC) (GLuint program, GLenum binaryFormat, const void *bin
ary, GLint length);
#endif

/* GL_OES_mapbuffer */
#ifndef GL_OES_mapbuffer
#define GL_OES_mapbuffer 1
#ifdef GL_GLEXT_PROTOTYPES
GL_APICALL void* GL_APIENTRY glMapBufferOES (GLenum target, GLenum access);
GL_APICALL GLboolean GL_APIENTRY glUnmapBufferOES (GLenum target);
GL_APICALL void GL_APIENTRY glGetBufferPointervOES (GLenum target, GLenum pname, void** params);
#endif
typedef void* (GL_APIENTRYP PFNGLMAPBUFFEROESPROC) (GLenum target, GLenum access);
typedef GLboolean (GL_APIENTRYP PFNGLUNMAPBUFFEROESPROC) (GLenum target);
typedef void (GL_APIENTRYP PFNGLGETBUFFERPOINTERVOESPROC) (GLenum target, GLenum pname, void** params);
#endif

/* GL_OES_packed_depth_stencil */
#ifndef GL_OES_packed_depth_stencil
#define GL_OES_packed_depth_stencil 1
#endif
-- VISUAL --                                                   19        233,8        66%
[2] 0:[tmux]* 1:sudo- 2:bash
```

```
hellofunc.o: in function `init':                                                        [411/1810]
hellofunc.c:(.text+0x44): undefined reference to `glMapBufferOES'
/home/richard/share/mainline/staging_dir/toolchain-arm_cortex-a7+neon-vfpv4_gcc-11.2.0_musl_eabi
/lib/gcc/arm-openwrt-linux-muslgnueabi/11.2.0/../../../../arm-openwrt-linux-muslgnueabi/bin/ld:
hellofunc.c:(.text+0x74): undefined reference to `glUnmapBufferOES'
/home/richard/share/mainline/staging_dir/toolchain-arm_cortex-a7+neon-vfpv4_gcc-11.2.0_musl_eabi
/lib/gcc/arm-openwrt-linux-muslgnueabi/11.2.0/../../../../arm-openwrt-linux-muslgnueabi/bin/ld:
hellofunc.o: in function `display':
hellofunc.c:(.text+0x13c): undefined reference to `SDL_GL_SwapBuffers'
/home/richard/share/mainline/staging_dir/toolchain-arm_cortex-a7+neon-vfpv4_gcc-11.2.0_musl_eabi
/lib/gcc/arm-openwrt-linux-muslgnueabi/11.2.0/../../../../arm-openwrt-linux-muslgnueabi/bin/ld:
/home/richard/share/mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/usr/lib/libMa
li.so: undefined reference to `kill@GLIBC_2.4'
/home/richard/share/mainline/staging_dir/toolchain-arm_cortex-a7+neon-vfpv4_gcc-11.2.0_musl_eabi
/lib/gcc/arm-openwrt-linux-muslgnueabi/11.2.0/../../../../arm-openwrt-linux-muslgnueabi/bin/ld:
/home/richard/share/mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/usr/lib/libMa
li.so: undefined reference to `strtol@GLIBC_2.4'
/home/richard/share/mainline/staging_dir/toolchain-arm_cortex-a7+neon-vfpv4_gcc-11.2.0_musl_eabi
/lib/gcc/arm-openwrt-linux-muslgnueabi/11.2.0/../../../../arm-openwrt-linux-muslgnueabi/bin/ld:
/home/richard/share/mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/usr/lib/libMa
li.so: undefined reference to `ump_reference_release'
/home/richard/share/mainline/staging_dir/toolchain-arm_cortex-a7+neon-vfpv4_gcc-11.2.0_musl_eabi
/lib/gcc/arm-openwrt-linux-muslgnueabi/11.2.0/../../../../arm-openwrt-linux-muslgnueabi/bin/ld:
/home/richard/share/mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/usr/lib/libMa
li.so: undefined reference to `ump_handle_create_from_secure_id'
/home/richard/share/mainline/staging_dir/toolchain-arm_cortex-a7+neon-vfpv4_gcc-11.2.0_musl_eabi
```

```
richard@richard-NH50-70RA:~/work/2022/k516$ find mainline/staging_dir/ -name "*glibc*"
mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/host/libltdl/share/libtool/libltd
l/lt__glibc.h
mainline/staging_dir/host/share/aclocal/glibc2.m4
mainline/staging_dir/host/share/aclocal/glibc21.m4
mainline/staging_dir/host/share/libtool/libltdl/libltdl/lt__glibc.h
mainline/staging_dir/toolchain-arm_cortex-a7+neon-vfpv4_gcc-11.2.0_musl_eabi/lib/gcc/arm-openwrt
-linux-muslgnueabi/11.2.0/plugin/include/config/glibc-stdint.h
mainline/staging_dir/toolchain-arm_cortex-a7+neon-vfpv4_gcc-11.2.0_musl_eabi/initial/lib/gcc/arm
-openwrt-linux-muslgnueabi/11.2.0/plugin/include/config/glibc-stdint.h
mainline/staging_dir/hostpkg/lib/python3.10/site-packages/pip/_internal/utils/__pycache__/glibc.
cpython-310.pyc
mainline/staging_dir/hostpkg/lib/python3.10/site-packages/pip/_internal/utils/glibc.py
richard@richard-NH50-70RA:~/work/2022/k516$
richard@richard-NH50-70RA:~/work/2022/k516$ grep -i glMapBufferOES -r mainline/staging_dir/targe
t-arm_cortex-a7+neon-vfpv4_musl_eabi/*
mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/usr/include/GLES2/gl2ext.h:GL_API
CALL void* GL_APIENTRY glMapBufferOES (GLenum target, GLenum access);
mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/usr/include/GLES2/gl2ext.h:typede
f void* (GL_APIENTRYP PFNGLMAPBUFFEROESPROC) (GLenum target, GLenum access);
mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/usr/include/GLES/glext.h:GL_API v
oid* GL_APIENTRY glMapBufferOES (GLenum target, GLenum access);
mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/usr/include/GLES/glext.h:typedef
void* (GL_APIENTRYP PFNGLMAPBUFFEROESPROC) (GLenum target, GLenum access);
richard@richard-NH50-70RA:~/work/2022/k516$
                                                      "richard@e1a395d6c3e1:" 08:23 08-3月-22
```

see the picture.
Left-UP window: the c code follow the tutorial, highlight calling to glMapBufferOES()
Left-Down window: prototype of glMapBufferOES(), here you see, it depends on definition of GL_GLEXT_PROTOTYPES
Right-UP window: compiling pass, but link stage failed, due to undefined reference to glMapBufferOES
Right-Down window: Can find glMapBufferOES() in header files, but not in binary.

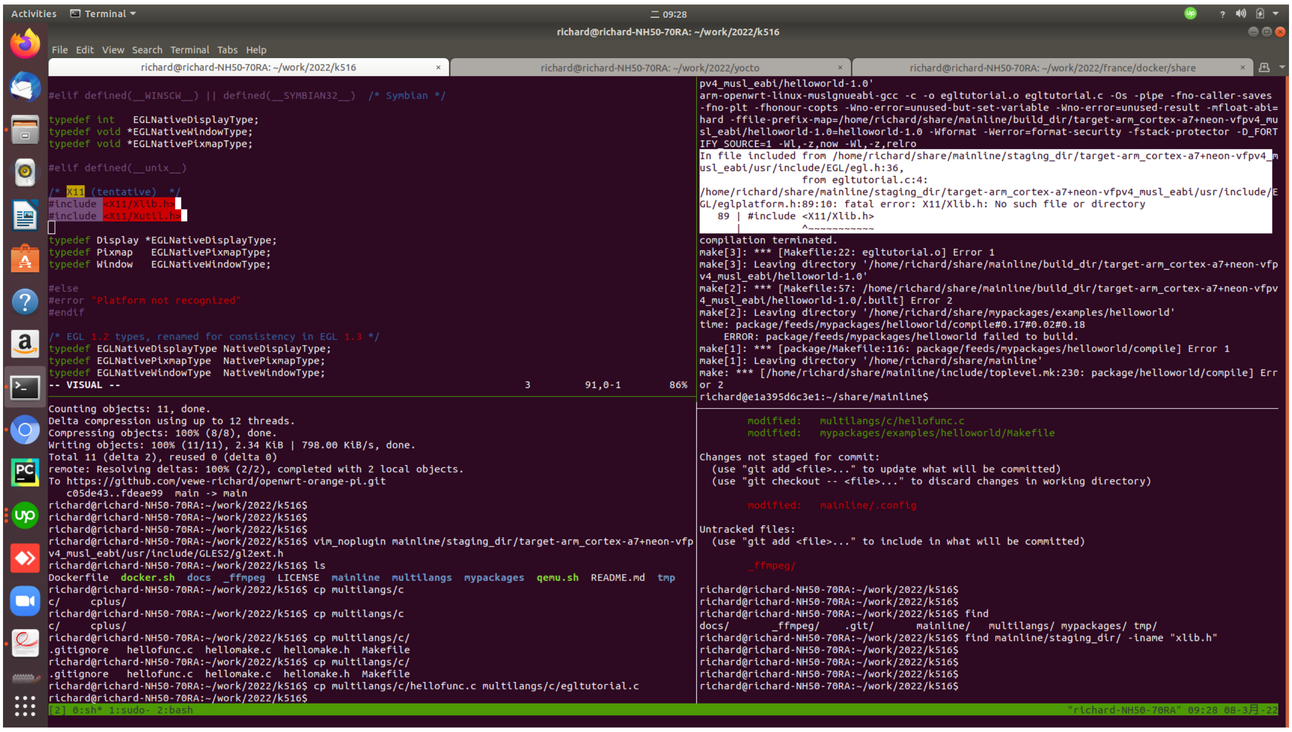
This means, tutorial use GL_GLEXT_PROTOTYPES, but the mali library does not contain it.

3. compiling egl sample applicaton with sunxi-mali library

Follow below link to create a sample application.
https://forums.developer.nvidia.com/t/egl-without-x11/58733

see the source file in
https://github.com/vewe-richard/openwrt-orange-pi.git
multilangs/c/egltutorial.c

compiling by command,
make V=s package/helloworld/{clean,compile}


Activities
Terminal
09:28
richard@richard-NH50-70RA: ~/work/2022/k516
File Edit View Search Terminal Tabs Help
richard@richard-NH50-70RA: ~/work/2022/k516
richard@richard-NH50-70RA: ~/work/2022/yocto
richard@richard-NH50-70RA: ~/work/2022/france/docker/share

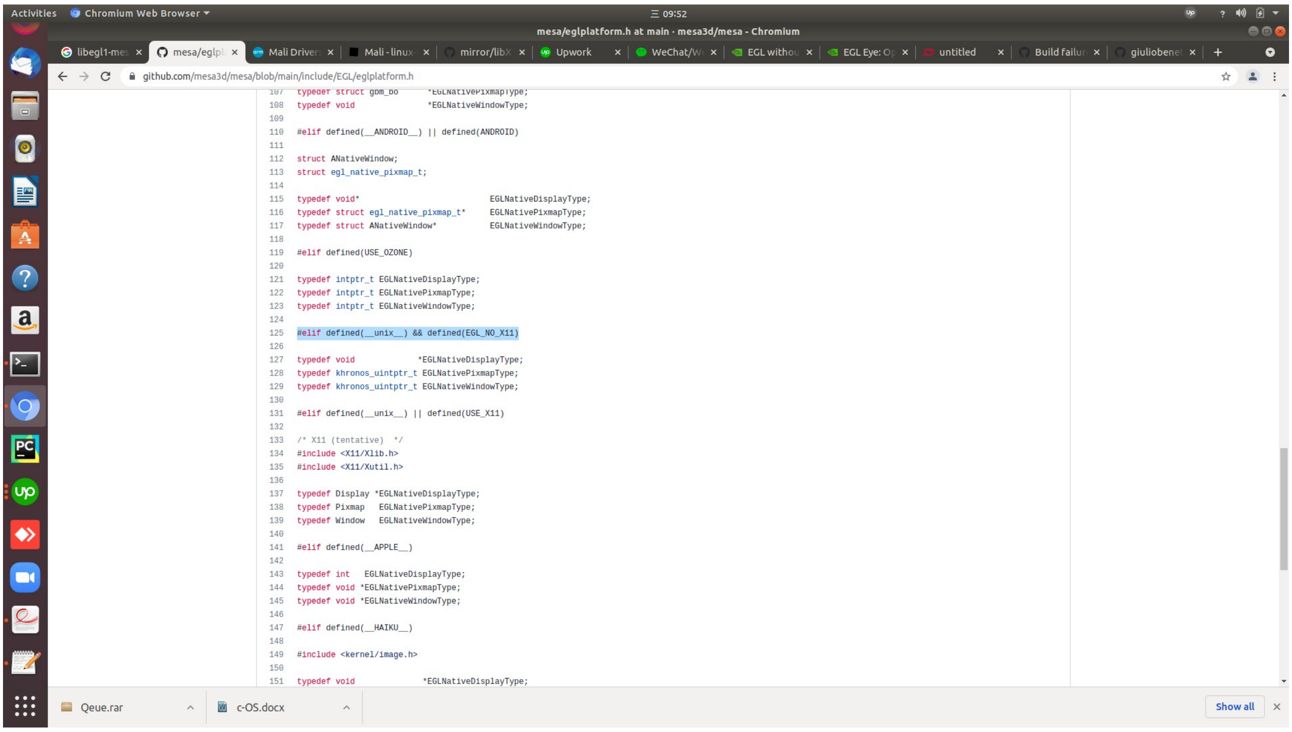
```
#elif defined(__WINSCW__) || defined(__SYMBIAN32__)  /* Symbian */

typedef int   EGLNativeDisplayType;
typedef void *EGLNativeWindowType;
typedef void *EGLNativePixmapType;

#elif defined(__unix__)

/* X11 (tentative)  */
#include <X11/Xlib.h>
#include <X11/Xutil.h>

typedef Display *EGLNativeDisplayType;
typedef Pixmap   EGLNativePixmapType;
typedef Window   EGLNativeWindowType;

#else
#error "Platform not recognized"
#endif

/* EGL 1.2 types, renamed for consistency in EGL 1.3 */
typedef EGLNativeDisplayType NativeDisplayType;
typedef EGLNativePixmapType  NativePixmapType;
typedef EGLNativeWindowType  NativeWindowType;
-- VISUAL --                                                3         91,0-1        86%
```

```
Counting objects: 11, done.
Delta compression using up to 12 threads.
Compressing objects: 100% (8/8), done.
Writing objects: 100% (11/11), 2.34 KiB | 798.00 KiB/s, done.
Total 11 (delta 2), reused 0 (delta 0)
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/vewe-richard/openwrt-orange-pi.git
   c05de43..fdeae99  main -> main
richard@richard-NH50-70RA:~/work/2022/k516$
richard@richard-NH50-70RA:~/work/2022/k516$
richard@richard-NH50-70RA:~/work/2022/k516$
richard@richard-NH50-70RA:~/work/2022/k516$ vim_noplugin mainline/staging_dir/target-arm_cortex-a7+neon-vfp
v4_musl_eabi/usr/include/GLES2/gl2ext.h
richard@richard-NH50-70RA:~/work/2022/k516$ ls
Dockerfile  docker.sh  docs  _ffmpeg  LICENSE  mainline  multilangs  mypackages  qemu.sh  README.md  tmp
richard@richard-NH50-70RA:~/work/2022/k516$ cp multilangs/c
c/     cplus/
richard@richard-NH50-70RA:~/work/2022/k516$ cp multilangs/c
c/     cplus/
richard@richard-NH50-70RA:~/work/2022/k516$ cp multilangs/c/
.gitignore   hellofunc.c  hellomake.c  hellomake.h  Makefile
richard@richard-NH50-70RA:~/work/2022/k516$ cp multilangs/c/
.gitignore   hellofunc.c  hellomake.c  hellomake.h  Makefile
richard@richard-NH50-70RA:~/work/2022/k516$ cp multilangs/c/hellofunc.c multilangs/c/egltutorial.c
richard@richard-NH50-70RA:~/work/2022/k516$
[2] 0:sh* 1:sudo- 2:bash
```

```
pv4_musl_eabi/helloworld-1.0'
arm-openwrt-linux-muslgnueabi-gcc -c -o egltutorial.o egltutorial.c -Os -pipe -fno-caller-saves
-fno-plt -fhonour-copts -Wno-error=unused-but-set-variable -Wno-error=unused-result -mfloat-abi=
hard -ffile-prefix-map=/home/richard/share/mainline/build_dir/target-arm_cortex-a7+neon-vfpv4_mu
sl_eabi/helloworld-1.0=helloworld-1.0 -Wformat -Werror=format-security -fstack-protector -D_FORT
IFY_SOURCE=1 -Wl,-z,now -Wl,-z,relro
In file included from /home/richard/share/mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_m
usl_eabi/usr/include/EGL/egl.h:36,
                 from egltutorial.c:4:
/home/richard/share/mainline/staging_dir/target-arm_cortex-a7+neon-vfpv4_musl_eabi/usr/include/E
GL/eglplatform.h:89:10: fatal error: X11/Xlib.h: No such file or directory
   89 | #include <X11/Xlib.h>
      |          ^~~~~~~~~~~~
compilation terminated.
make[3]: *** [Makefile:22: egltutorial.o] Error 1
make[3]: Leaving directory '/home/richard/share/mainline/build_dir/target-arm_cortex-a7+neon-vfp
v4_musl_eabi/helloworld-1.0'
make[2]: *** [Makefile:57: /home/richard/share/mainline/build_dir/target-arm_cortex-a7+neon-vfpv
4_musl_eabi/helloworld-1.0/.built] Error 2
make[2]: Leaving directory '/home/richard/share/mypackages/examples/helloworld'
time: package/feeds/mypackages/helloworld/compile#0.17#0.02#0.18
    ERROR: package/feeds/mypackages/helloworld failed to build.
make[1]: *** [package/Makefile:116: package/feeds/mypackages/helloworld/compile] Error 1
make[1]: Leaving directory '/home/richard/share/mainline'
make: *** [/home/richard/share/mainline/include/toplevel.mk:230: package/helloworld/compile] Err
or 2
richard@e1a395d6c3e1:~/share/mainline$
```

```
        modified:   multilangs/c/hellofunc.c
        modified:   mypackages/examples/helloworld/Makefile

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   mainline/.config

Untracked files:
  (use "git add <file>..." to include in what will be committed)

        _ffmpeg/

richard@richard-NH50-70RA:~/work/2022/k516$
richard@richard-NH50-70RA:~/work/2022/k516$
richard@richard-NH50-70RA:~/work/2022/k516$ find
docs/       _ffmpeg/    .git/       mainline/   multilangs/ mypackages/ tmp/
richard@richard-NH50-70RA:~/work/2022/k516$ find mainline/staging_dir/ -iname "xlib.h"
richard@richard-NH50-70RA:~/work/2022/k516$
richard@richard-NH50-70RA:~/work/2022/k516$
richard@richard-NH50-70RA:~/work/2022/k516$
richard@richard-NH50-70RA:~/work/2022/k516$
                                                  "richard-NH50-70RA" 09:28 08-3月-22
```

It means, old egl.h in sunx-mali package depends on x11 header files,
But latest egl in https://github.com/mesa3d/mesa/ can exclude x11 from depending list.



```
typedef struct gbm_bo      *EGLNativePixmapType;
typedef void               *EGLNativeWindowType;

#elif defined(__ANDROID__) || defined(ANDROID)

struct ANativeWindow;
struct egl_native_pixmap_t;

typedef void*                           EGLNativeDisplayType;
typedef struct egl_native_pixmap_t*     EGLNativePixmapType;
typedef struct ANativeWindow*           EGLNativeWindowType;

#elif defined(USE_OZONE)

typedef intptr_t EGLNativeDisplayType;
typedef intptr_t EGLNativePixmapType;
typedef intptr_t EGLNativeWindowType;

#elif defined(__unix__) && defined(EGL_NO_X11)

typedef void              *EGLNativeDisplayType;
typedef khronos_uintptr_t EGLNativePixmapType;
typedef khronos_uintptr_t EGLNativeWindowType;

#elif defined(__unix__) || defined(USE_X11)

/* X11 (tentative)  */
#include <X11/Xlib.h>
#include <X11/Xutil.h>

typedef Display *EGLNativeDisplayType;
typedef Pixmap   EGLNativePixmapType;
typedef Window   EGLNativeWindowType;

#elif defined(__APPLE__)

typedef int   EGLNativeDisplayType;
typedef void *EGLNativePixmapType;
typedef void *EGLNativeWindowType;

#elif defined(__HAIKU__)

#include <kernel/image.h>

typedef void              *EGLNativeDisplayType;
```