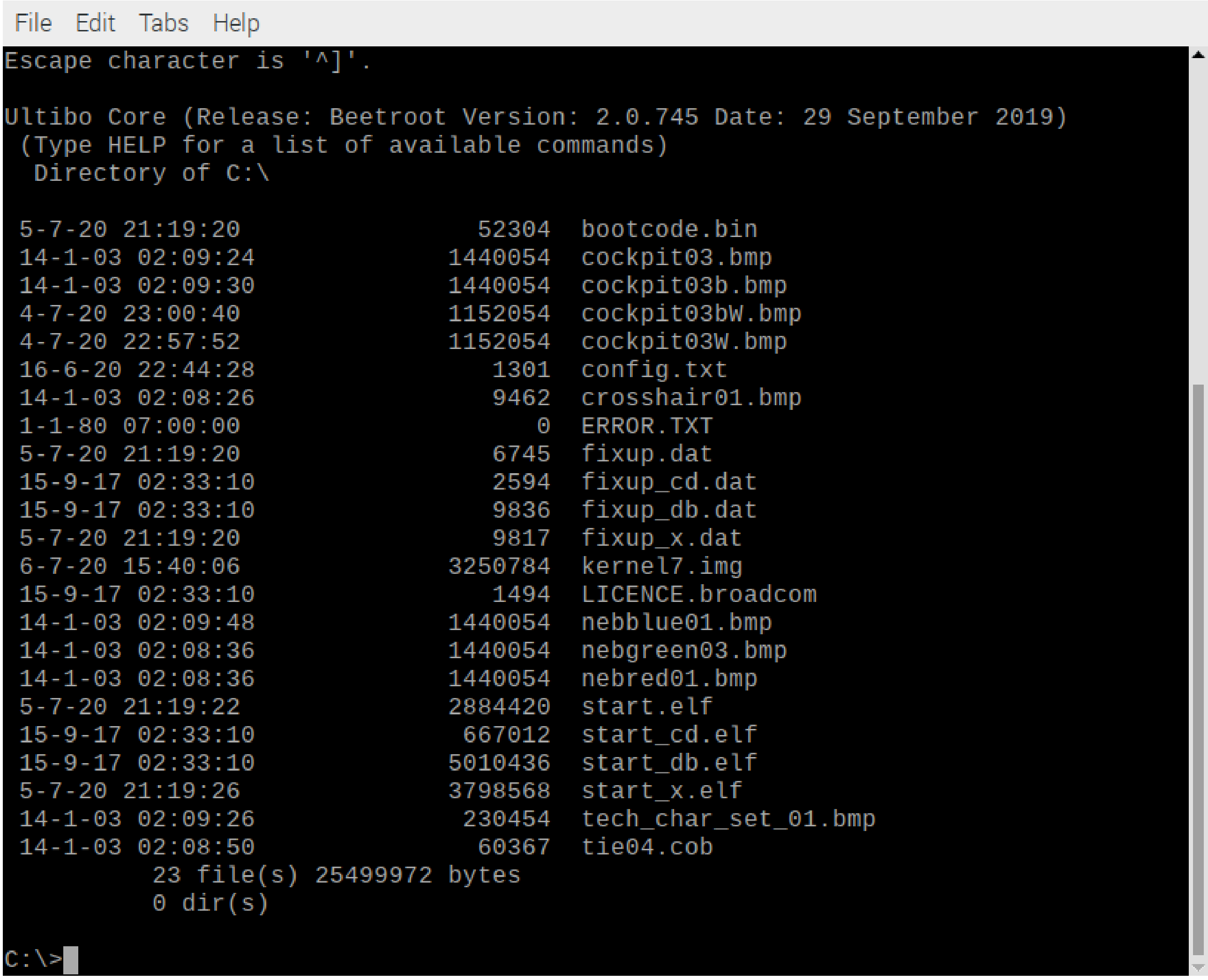
I prefer tftping the kernel7.img without the need of following steps:

Power down
remove the micro sd.
Transfer the kernel7.img to micro sd.
Re-insert the micro sd on the test Ultibo System.
Power up

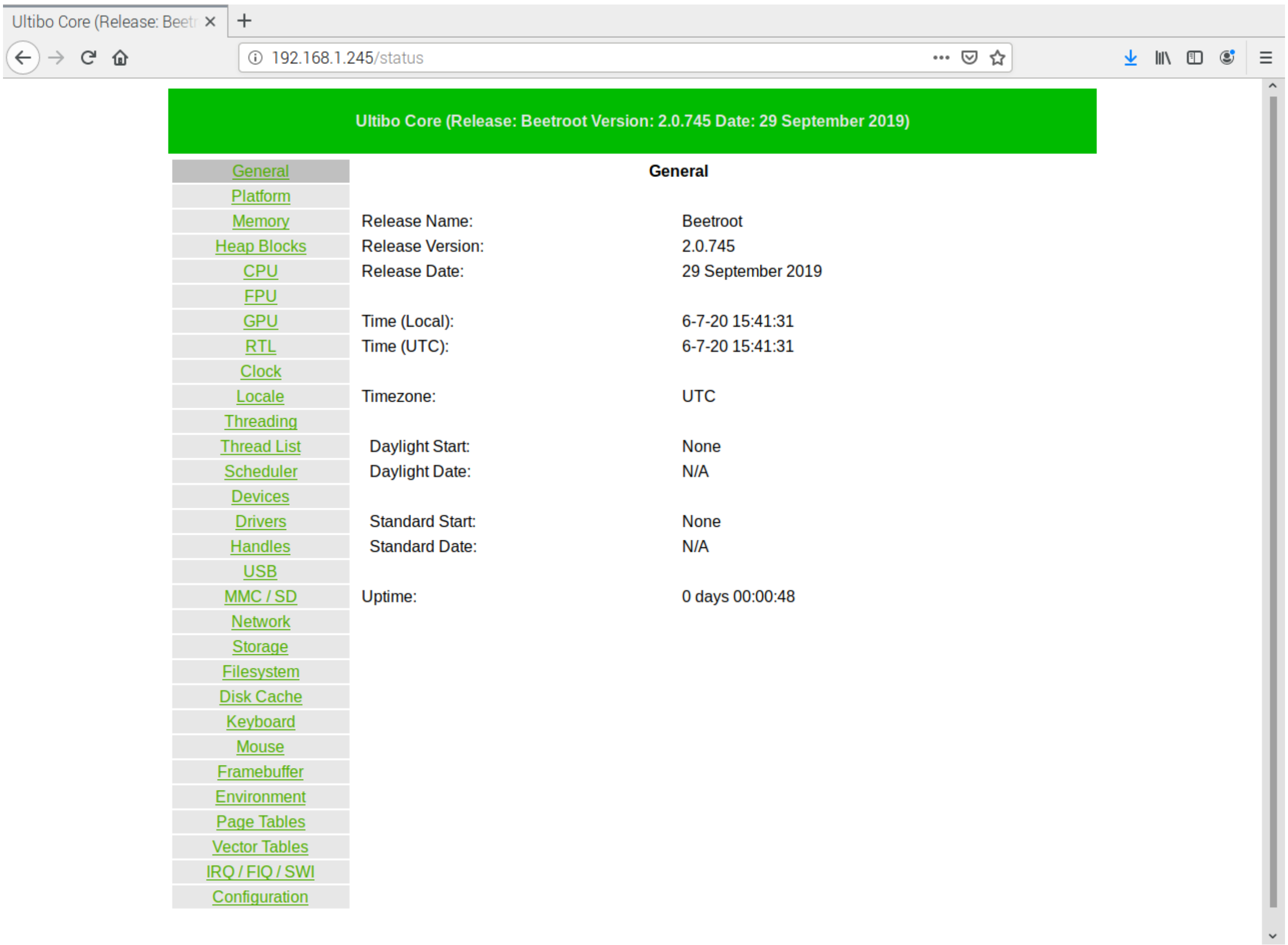
tftp xx.xx.xx.xx < cmdstftp
tftp> tftp> Sent 3250784 bytes in 36.3 seconds
Then the system reboots using the new kernel7.img

I also like seeing the files on the micro sd with a remote shell.
“telnet xx.xx.xx.xx”



```
Escape character is '^]'.

Ultibo Core (Release: Beetroot Version: 2.0.745 Date: 29 September 2019)
 (Type HELP for a list of available commands)
  Directory of C:\

 5-7-20 21:19:20                 52304  bootcode.bin
 14-1-03 02:09:24              1440054  cockpit03.bmp
 14-1-03 02:09:30              1440054  cockpit03b.bmp
 4-7-20 23:00:40               1152054  cockpit03bW.bmp
 4-7-20 22:57:52               1152054  cockpit03W.bmp
 16-6-20 22:44:28                 1301  config.txt
 14-1-03 02:08:26                 9462  crosshair01.bmp
 1-1-80 07:00:00                     0  ERROR.TXT
 5-7-20 21:19:20                  6745  fixup.dat
 15-9-17 02:33:10                 2594  fixup_cd.dat
 15-9-17 02:33:10                 9836  fixup_db.dat
 5-7-20 21:19:20                  9817  fixup_x.dat
 6-7-20 15:40:06               3250784  kernel7.img
 15-9-17 02:33:10                 1494  LICENCE.broadcom
 14-1-03 02:09:48              1440054  nebblue01.bmp
 14-1-03 02:08:36              1440054  nebgreen03.bmp
 14-1-03 02:08:36              1440054  nebred01.bmp
 5-7-20 21:19:22               2884420  start.elf
 15-9-17 02:33:10               667012  start_cd.elf
 15-9-17 02:33:10              5010436  start_db.elf
 5-7-20 21:19:26               3798568  start_x.elf
 14-1-03 02:09:26               230454  tech_char_set_01.bmp
 14-1-03 02:08:50                60367  tie04.cob
          23 file(s) 25499972 bytes
          0 dir(s)

C:\>
```

xx.xx.xx.xx/status



Ultibo Core (Release: Beetroot Version: 2.0.745 Date: 29 September 2019)

General

Release Name:	Beetroot
Release Version:	2.0.745
Release Date:	29 September 2019
Time (Local):	6-7-20 15:41:31
Time (UTC):	6-7-20 15:41:31
Timezone:	UTC
Daylight Start:	None
Daylight Date:	N/A
Standard Start:	None
Standard Date:	N/A
Uptime:	0 days 00:00:48

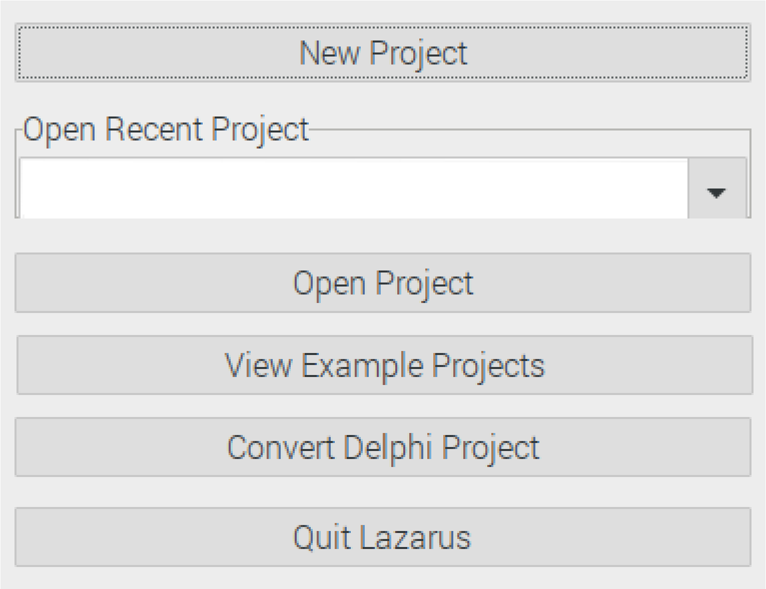
06/20/20
Forked the project from
"https://github.com/cejasmasmas/software-rasterizer-ultibo-"
commit ad8fd4c4881a9d0213a427dd2adeb5ab4c527ef9 (HEAD -> master, origin/master, origin/HEAD)
Author: cejasmasmas <65371443+cejasmasmas@users.noreply.github.com>
Date: Sat Jun 20 22:33:35 2020 -0600

    Add files via upload

Since my original forked “ad8fd4c4881a9d0213a427dd2adeb5ab4c527ef9” had gone thru several modifications. A merge was required.

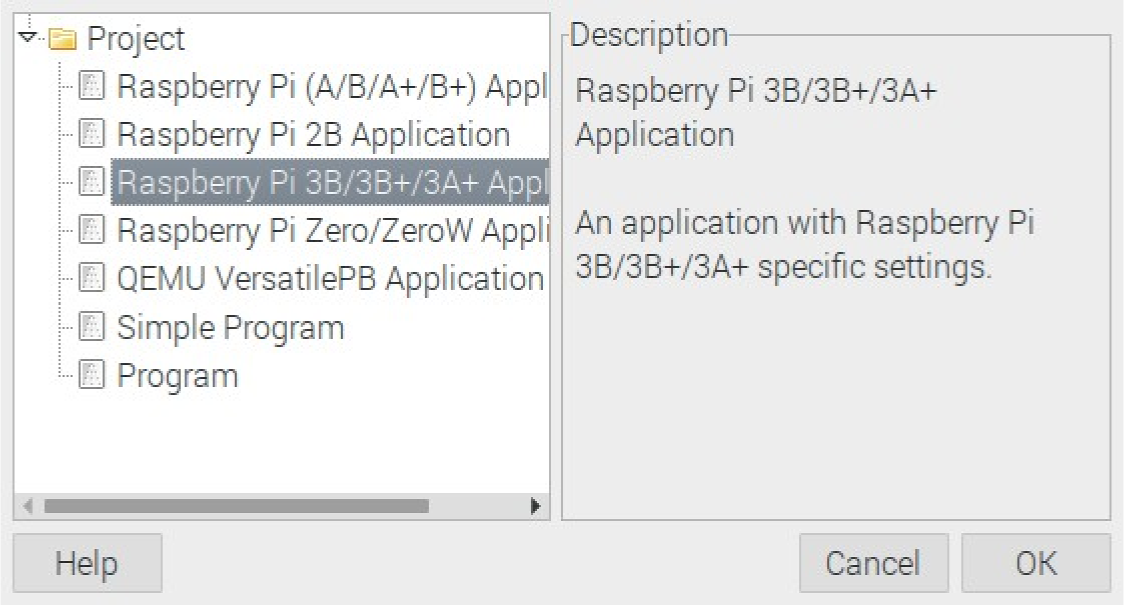
```
git remote add upstream https://github.com/cejasmasmas/software-rasterizer-ultibo-
git fetch upstream
git merge upstream/master

git push origin master
```

This update the project to the same as **Ultibo member JRsamyoa** “57fc04fa13fe90c0cdca9ff6cd37b0a74bc5561c” on github.



Depress New Project

This project will be for a Raspberry Pi 3


Project
Raspberry Pi (A/B/A+/B+) Appl
Raspberry Pi 2B Application
Raspberry Pi 3B/3B+/3A+ Appl
Raspberry Pi Zero/ZeroW Appli
QEMU VersatilePB Application
Simple Program
Program
Description
Help
Cancel
OK

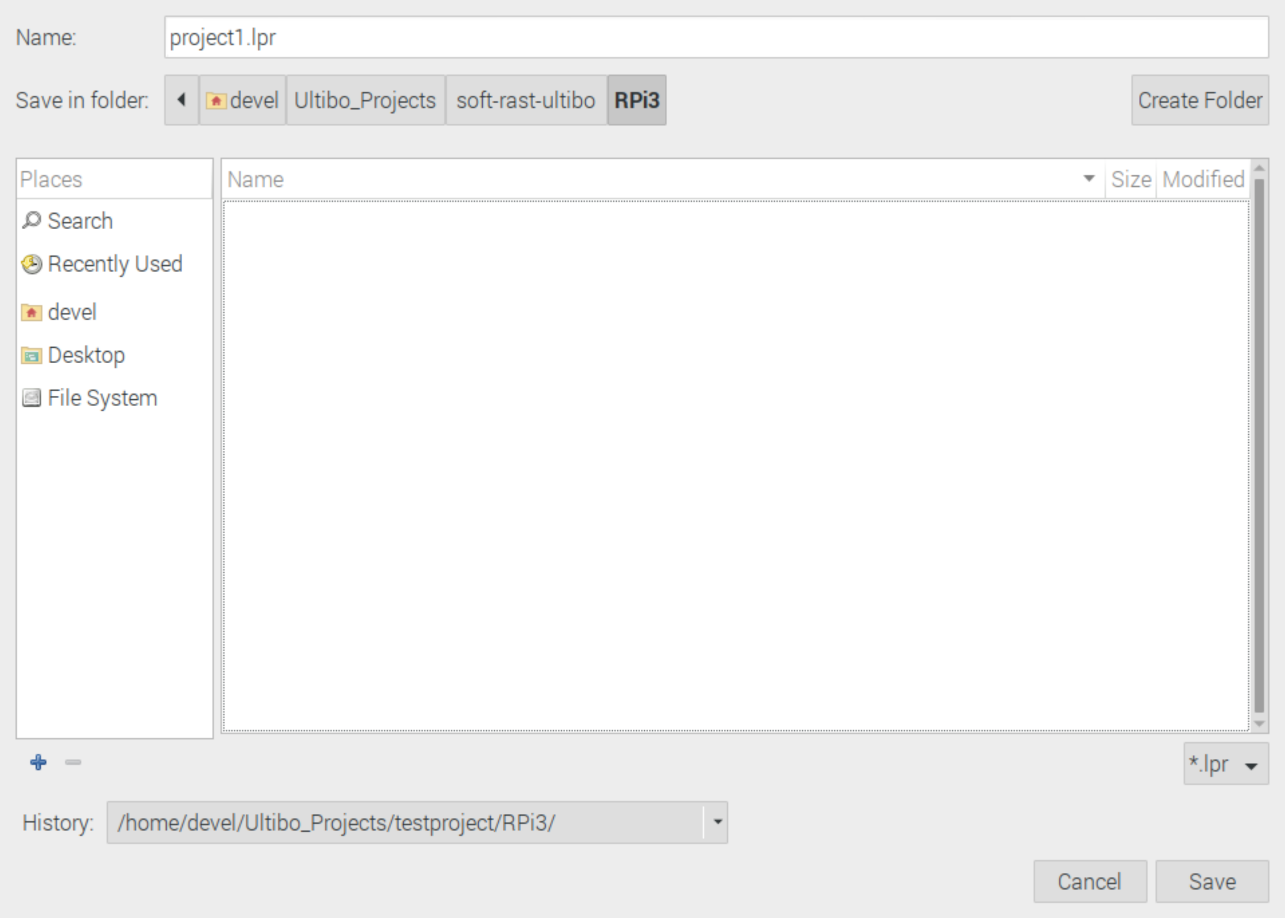
Raspberry Pi 3B/3B+/3A+ Application

An application with Raspberry Pi 3B/3B+/3A+ specific settings.

Depress OK

Lazarus IDE (Ultibo Edition)
In my Ultibo_Projects
soft-rast-ultibo/Rpi3

Note: The name was project1.lpr. This was the name Ultibo member JRsamyoa used in his project. This is the point where a new name could have been selected.



Name: project1.lpr

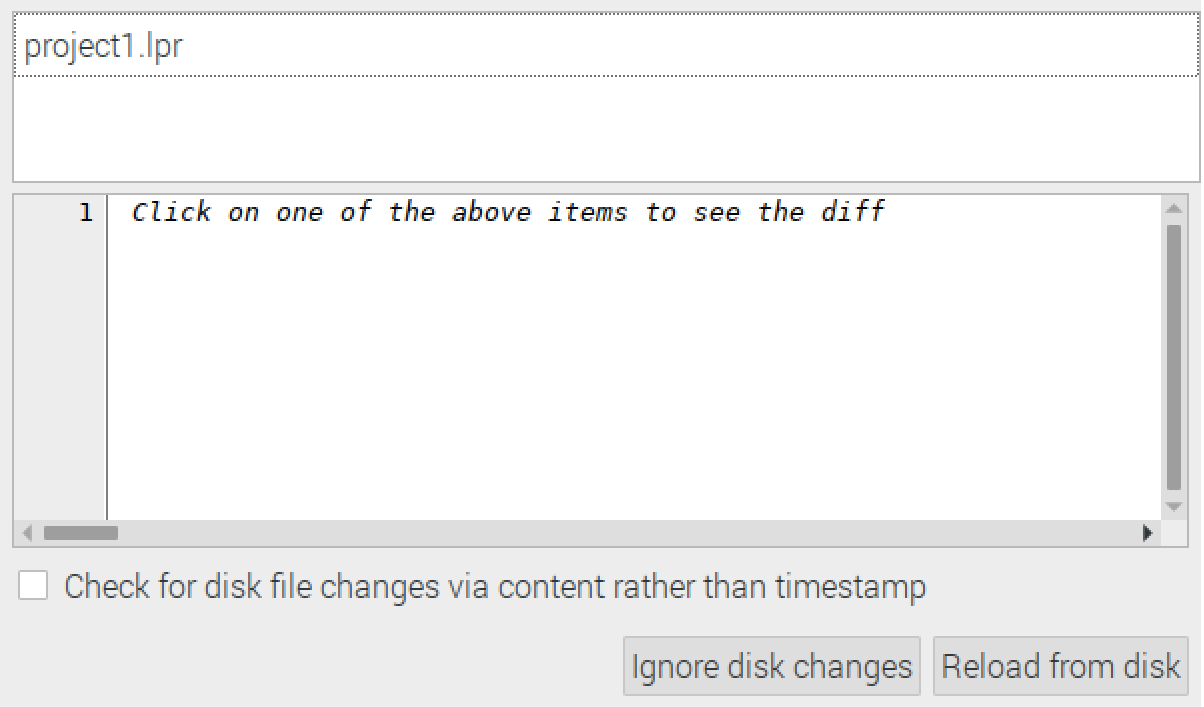
Save in folder: devel / Ultibo_Projects / soft-rast-ultibo / RPi3

History: /home/devel/Ultibo_Projects/testproject/RPi3/

Over wtite the project1.lpr with the file from   software-rasterizer-ultibo-/project1.lpr

```
cp software-rasterizer-ultibo-/project1.lpr Ultibo_Projects/soft-rast-ultibo/Rpi3/
```

This will prompt to Reload from disk



project1.lpr

```
1  Click on one of the above items to see the diff
```

☐ Check for disk file changes via content rather than timestamp

Depress Reload from disk

At this point the project needs to several C libraries.

```
{$linklib Testnanogl}
{$linklib t3dlib1}
{$linklib t3dlib4}
{$linklib t3dlib5}
{$linklib t3dlib6}
{$linklib t3dlib7}
{$linklib t3dlib8}
{$linklib t3dlib9}
{$linklib t3dlib10}
{$linklib t3dlib11}
{$linklib t3dlib12}
{$linklib t3dlib13}
```

The above C & headers are in a folder “***t3eng***”
In additon the main C library is needed.

```
procedure test; cdecl; external 'libTestnanogl' name 'test';
```

Adding the 2nd project Ultibo_Projects/soft-rast-ultibo/
Ultibo member JRsamayoa must work on MS Windows where upper/lower case is not a problem. I work on a RPi4. This require the headers to be lower case.
modified:

```
t3deng/t3dlib10.c  t3deng/t3dlib13.c  t3deng/t3dlib5.c  t3deng/t3dlib8.c
t3deng/t3dlib11.c  t3deng/t3dlib1.c   t3deng/t3dlib6.c  t3deng/t3dlib9.c
t3deng/t3dlib12.c  t3deng/t3dlib4.c   t3deng/t3dlib7.c
```

Since the headers were lower case.

```
t3deng/t3dlib10.h  t3deng/t3dlib13.h  t3deng/t3dlib5.h  t3deng/t3dlib8.h
t3deng/t3dlib11.h  t3deng/t3dlib1.h   t3deng/t3dlib6.h  t3deng/t3dlib9.h
t3deng/t3dlib12.h  t3deng/t3dlib4.h   t3deng/t3dlib7.h
```

Added a script buildlibs.sh which compiles

```
t3deng/t3dlib10.c  t3deng/t3dlib13.c  t3deng/t3dlib5.c  t3deng/t3dlib8.c
t3deng/t3dlib11.c  t3deng/t3dlib1.c   t3deng/t3dlib6.c  t3deng/t3dlib9.c
t3deng/t3dlib12.c  t3deng/t3dlib4.c   t3deng/t3dlib7.c
```

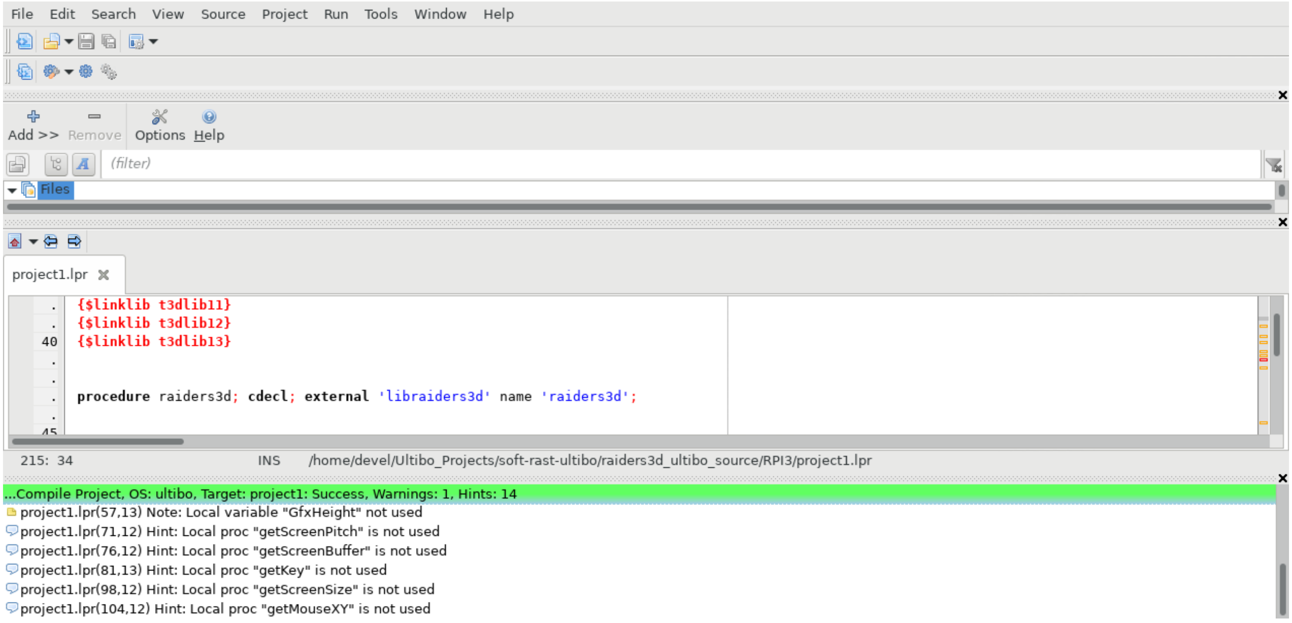
and raiders3d.c in ~/Ultibo_Projects/soft-rast-ultibo/raiders3d_ultibo_source/RPI3
create the libraries needed for the project.

```
libraider3d.a   libt3dlib11.a  libt3dlib1.a  libt3dlib6.a  libt3dlib9.a
libraiders3d.a  libt3dlib12.a  libt3dlib4.a  libt3dlib7.a
libt3dlib10.a   libt3dlib13.a  libt3dlib5.a  libt3dlib8.a
```

At this point the project needs to several C libraries.

```
{$linklib raiders3d}
{$linklib t3dlib1}
{$linklib t3dlib4}
{$linklib t3dlib5}
{$linklib t3dlib7}
{$linklib t3dlib6}
{$linklib t3dlib8}
```

```
{$linklib t3dlib9}
{$linklib t3dlib10}
{$linklib t3dlib11}
{$linklib t3dlib12}
{$linklib t3dlib13}


procedure raiders3d; cdecl; external 'libraiders3d' name 'raiders3d';
```



```
{$linklib t3dlib11}
{$linklib t3dlib12}
{$linklib t3dlib13}


procedure raiders3d; cdecl; external 'libraiders3d' name 'raiders3d';
```

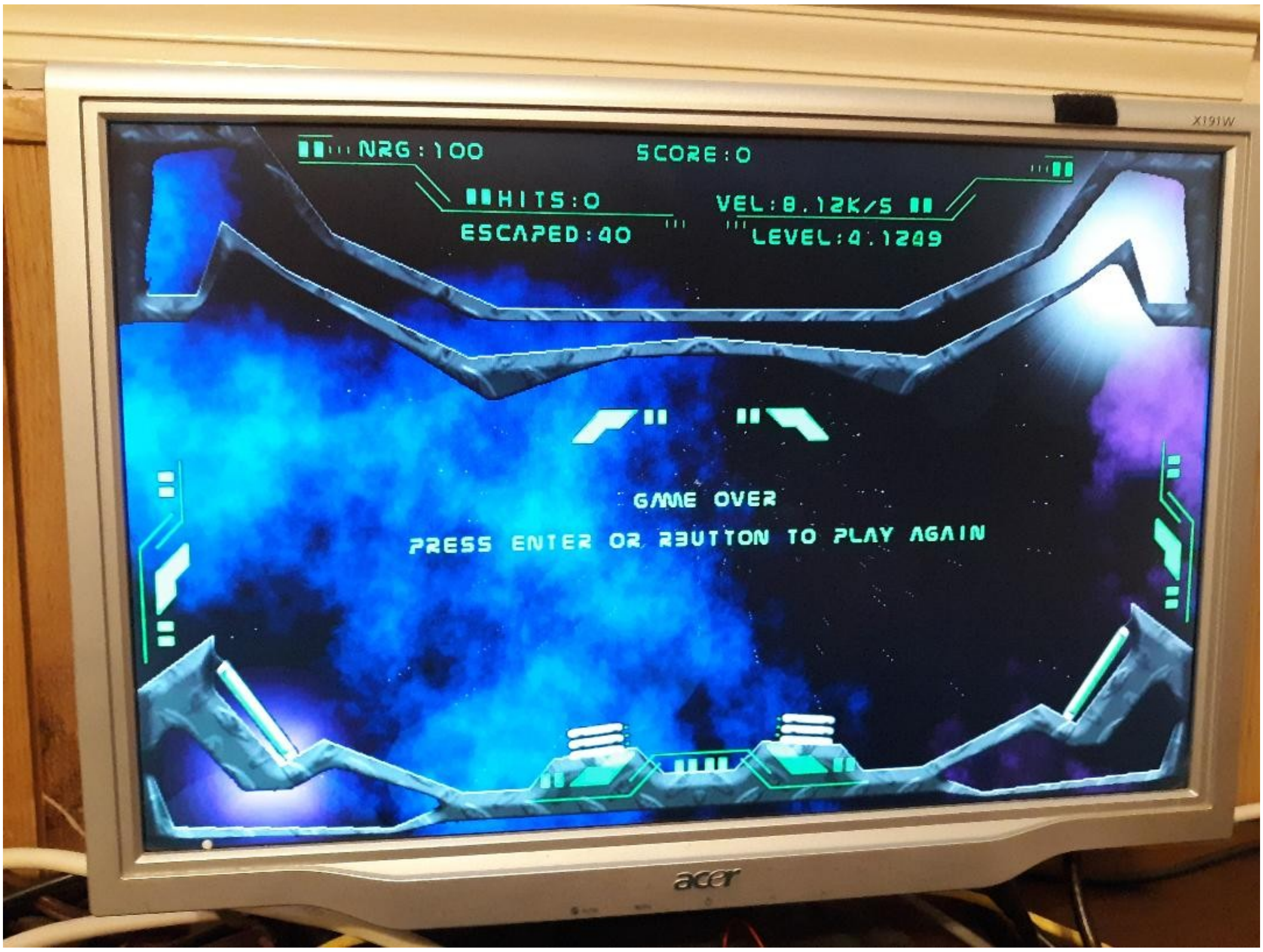
```
215: 34          INS     /home/devel/Ultibo_Projects/soft-rast-ultibo/raiders3d_ultibo_source/RPI3/project1.lpr
```

```
...Compile Project, OS: ultibo, Target: project1: Success, Warnings: 1, Hints: 14
project1.lpr(57,13) Note: Local variable "GfxHeight" not used
project1.lpr(71,12) Hint: Local proc "getScreenPitch" is not used
project1.lpr(76,12) Hint: Local proc "getScreenBuffer" is not used
project1.lpr(81,13) Hint: Local proc "getKey" is not used
project1.lpr(98,12) Hint: Local proc "getScreenSize" is not used
project1.lpr(104,12) Hint: Local proc "getMouseXY" is not used
```

After pressing the Run/Compile and the green bar appears the kernel7.img is ready to be transferred to the micro sd.

```
bootcode.bin     crosshair01.bmp  kernel7.img       start_db.elf
cockpit03b.bmp   ERROR.TXT        LICENCE.broadcom  start.elf
cockpit03.bmp    fixup_cd.dat     nebblue01.bmp     start_x.elf
cockpit03bW.bmp  fixup.dat        nebgreen03.bmp    tech_char_set_01.bmp
cockpit03W.bmp   fixup_db.dat     nebred01.bmp      tie04.cob
config.txt       fixup_x.dat      start_cd.elf
```

```
md5sum firmwar_for_ultibo/022720/*
156a886d5855e42a887f0dd9316fb4e3  firmwar_for_ultibo/022720/bootcode.bin
5fc4614096c4b753fd940b75b1fa2247  firmwar_for_ultibo/022720/fixup.dat
fb8e67c4e54427fdca9fab410d41ce2e  firmwar_for_ultibo/022720/fixup_x.dat
9864d17fa3bcd20738ee9c0c67b2330c  firmwar_for_ultibo/022720/start.elf
6fa698231abdd267ba84c4cf3c7ab8d2  firmwar_for_ultibo/022720/start_x.elf
```



GAME OVER

PRESS ENTER OR BUTTON TO PLAY AGAIN

Use the mouse to move the targeting reticule and the left mouse button to fire. To exit, press Esc. The gameplay logic is very simple: You must destroy the incoming enemies with your particle beam weapons. When 25 enemies escape your clutches, the game ends. To restart, simply press Return. Some of the other engine controls are still available, for example:

W—Toggles the wireframe mode
I—Toggles the primary sun point light
A—Toggles the ambient light