

X-Window & Networking

Goal: Accessing 1 of 5 RPi4B from the Over the Internet with graphical displays

- Examples graphical displays
 - Geany editor
 - Octave matlab like program
 - Gtkwave VCD viewer
 - Mousepad editor
 - GIMP
 - Lazarus IDE (Ulitobo Editor)
 - Bare metal for Pi
 - QEMU, Rpi Zero, RPi3B+, RPi4, and CM4

Internet

RPi3B+ 1Gb
162.197.186.179
pi4-40

pass-thru



ATT Router

RPi4B 4Gb



192.168.1.212
pi4-50

RPi4B 4Gb



192.168.1.211
pi4-30

RPi4B 4Gb



192.168.1.245
pi4-60

RPi4B 4Gb



192.168.1.229
pi4-27

RPi5 8Gb



192.168.1.93
pi5-70

RPi3B+ 1Gb



192.168.1.231
pi4-37

Century Link
192.168.14.
1

RPi ZeroW



192.168.1.235
wiiflxtender

Century
Link6

```
sudo route add -net 192.168.42.0 netmask 255.255.255.0 gw 192.168.1.235 eth0  
sudo route add -net 192.168.42.0 netmask 255.255.255.0 gw 192.168.1.235 wlan0
```

RPi4B 4Gb



192.168.42.116
pi4-20

RPi3B+ 1Gb



192.168.42.119
pi4-3

Century Link4
192.168.16.1

Century
Link3
192.168.12.
1

Internet

RPi3B+ 1Gb
162.197.186.179
pi4-40

pass-thru



ATT Router

RPi4B 4Gb



192.168.1.212
pi4-50

RPi4B 4Gb



192.168.1.230
pi4-30

RPi4B 4Gb



192.168.1.245
pi4-60

RPi4B 4Gb



192.168.1.229
pi4-27

RPi5 8Gb



192.168.1.93
pi5-70

RPi5 8Gb



192.168.1.240
pi5-80

RPi5 8Gb



192.168.1.253
pi5-90

Century Link
192.168.14.
1

RPi ZeroW



```
sudo route add -net 192.168.42.0 netmask 255.255.255.0 gw 192.168.1.235 eth0  
sudo route add -net 192.168.42.0 netmask 255.255.255.0 gw 192.168.1.235 wlan0
```

192.168.1.235
wiiflxtender

RPi4B 4Gb



192.168.42.116
pi4-20

RPi3B+ 1Gb



192.168.42.119
pi4-3

RPi3B+ 1Gb



192.168.42.105
pi4-37

Century Link4
192.168.16.1

Century
Link3
192.168.12.
1

Century
Link6
192.168.32.
1

pi4-50
Pico_w Zone1
remote1 192.168.1.160
remote3 192.168.1.178
remote4 192.168.1.177
remote5 192.168.1.168
remote6 192.168.1.175

pi4-20
Pico_w Zone3
SSID Century Link4
remote5 192.168.16.114

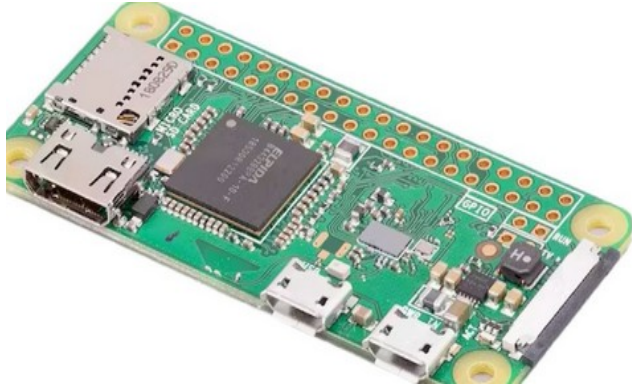
pi4-37
Pico_w Zone2
SSID Century Link6
remote5 192.168.32.106

pi4-3
Pico_w Zone4
SSID Century Link3
remote8 192.168.12.120
remote9 192.168.12.108
remote7 192.168.12.106

- Run Graphical Application

- Steps Required
 - Need to ssh to
- LAN Home RPi3B+ on 162.197.186.xx
- Need to ssh to 1 of 5 RPi4B
 -

RPi Models



RPi CM4



RPi3B+

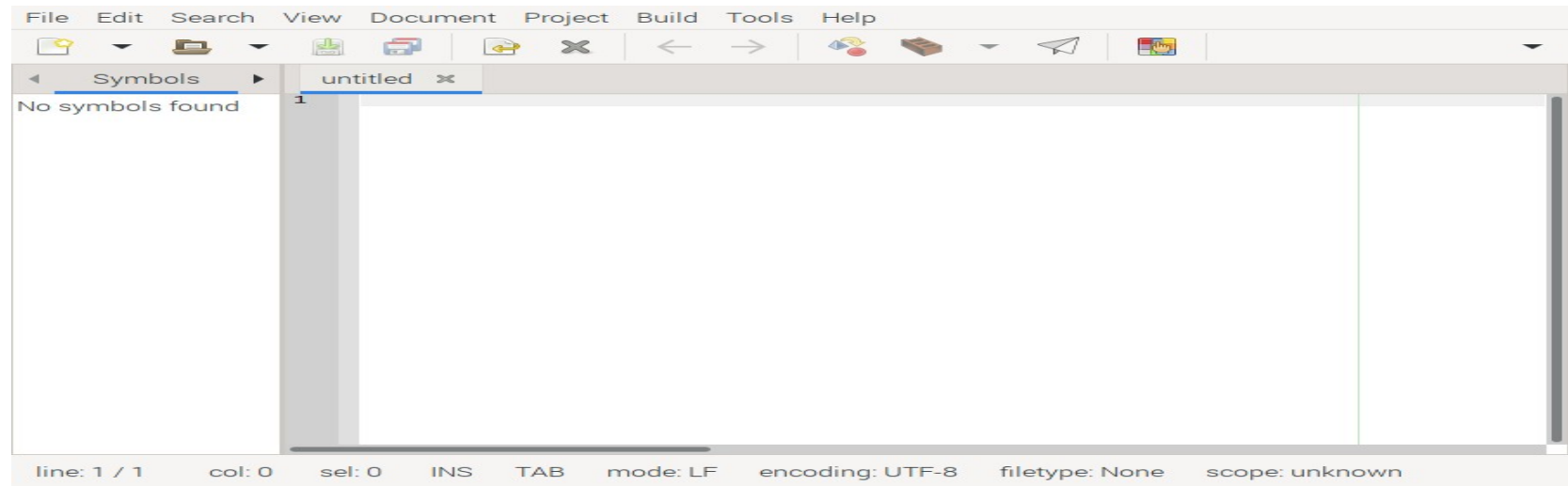


RPi4B



RPi3A


```
File Edit Tabs Help
devel@pi4-20:~/svd_rgb/src $ geany &
[1] 5418
devel@pi4-20:~/svd_rgb/src $
```



File Edit Search View Document Project Build Tools Help

Symbols disp_S.m x

No symbols found

```
58 fid = fopen('Sblu.bin','r'); blu = fread(fid, 512, 'float');
59
60 fid = fopen('rcred.bin','r'); im1 = fread(fid, [512,inf], 'int32');
61 fid = fopen('rcgrn.bin','r'); im2 = fread(fid, [512,inf], 'int32');
62 fid = fopen('rcblyu.bin','r'); im3 = fread(fid, [512,inf], 'int32');
63
64 aa(1:n)= red(1:n);
65 figure
66 stem(aa)
67 title("n S values red image from C img_svd")
68
69 figure;
70 imagesc(im1);
71 colorbar;
72 colormap 'gray';
73 title 'rcred svd from c'
74
75
76 bb(1:n)= grn(1:n);
77 figure
78 stem(bb)
79 title("n S value green image from C img_svd")
80
81 figure;
82 imagesc(im2);
83 colorbar;
84 colormap 'gray';
85 title 'rcgrn svd from c'
86
```

line: 67 / 101 col: 42 sel: 35 INS TAB mode: LF encoding: UTF-8 filetype: Matlab/Octave scope: unknown

```
File Edit Tabs Help
devel@pi4-20:~/svd_rgb/src $ octave
GNU Octave, version 6.2.0
Copyright (C) 2021 The Octave Project Developers.
This is free software; see the source code for copying conditions.
There is ABSOLUTELY NO WARRANTY; not even for MERCHANTABILITY or
FITNESS FOR A PARTICULAR PURPOSE. For details, type 'warranty'.

Octave was configured for "aarch64-unknown-linux-gnu".

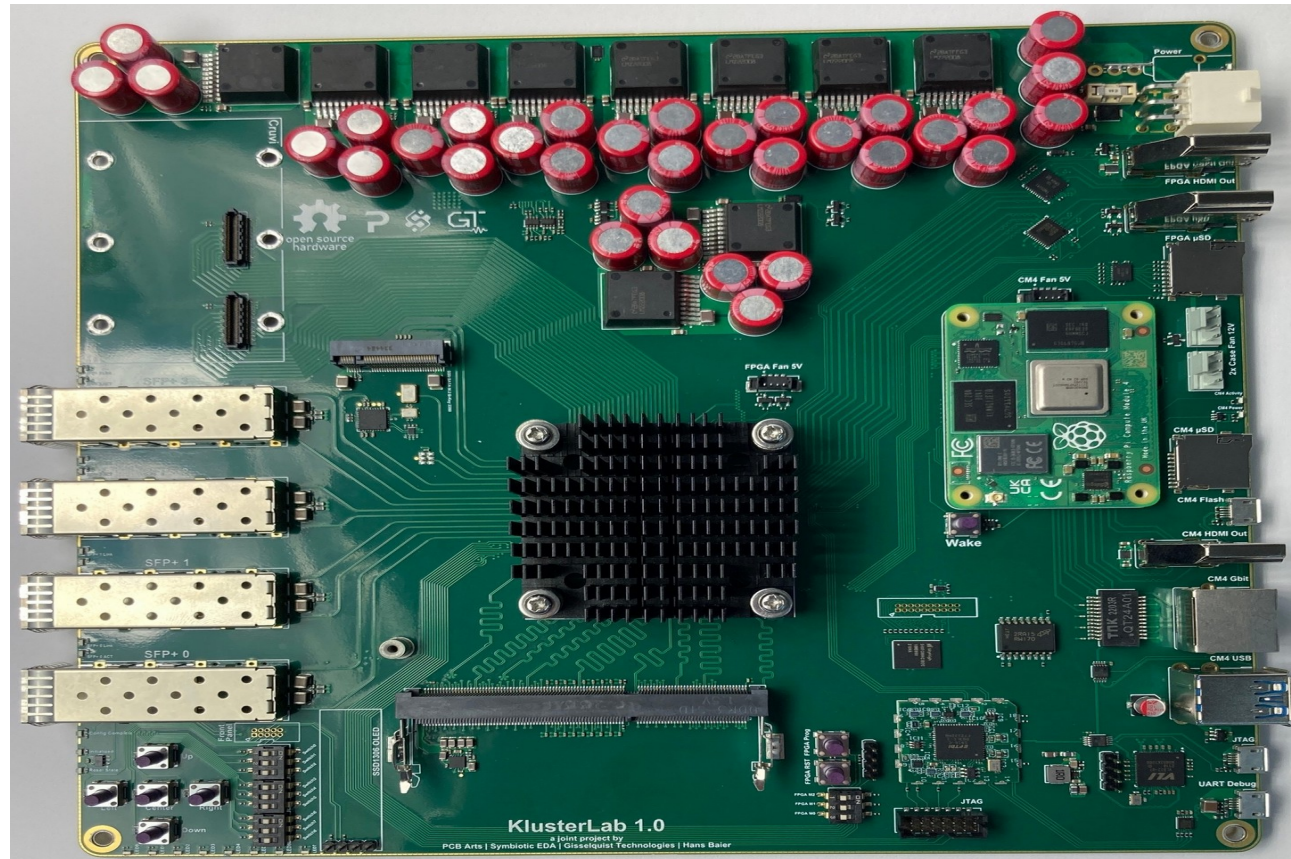
Additional information about Octave is available at https://www.octave.org.

Please contribute if you find this software useful.
For more information, visit https://www.octave.org/get-involved.html

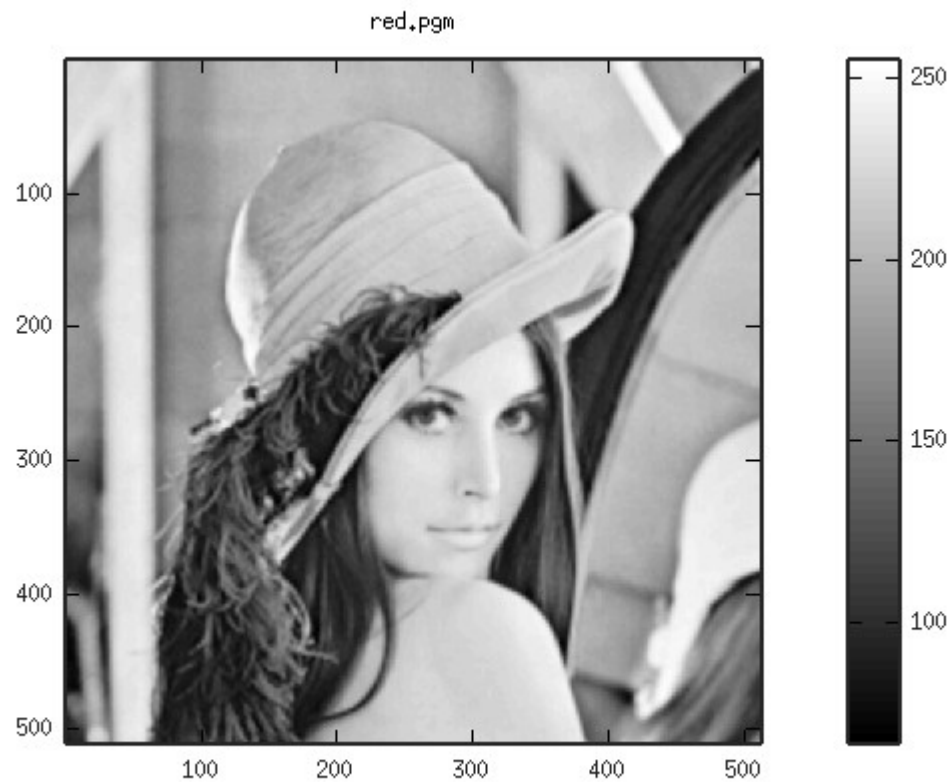
Read https://www.octave.org/bugs.html to learn how to submit bug reports.
For information about changes from previous versions, type 'news'.

octave:1> disp_S
octave:2> 
```

Rpi CM4 with FPGA Kintex-7 160T with 4 Ethernet 10Gb

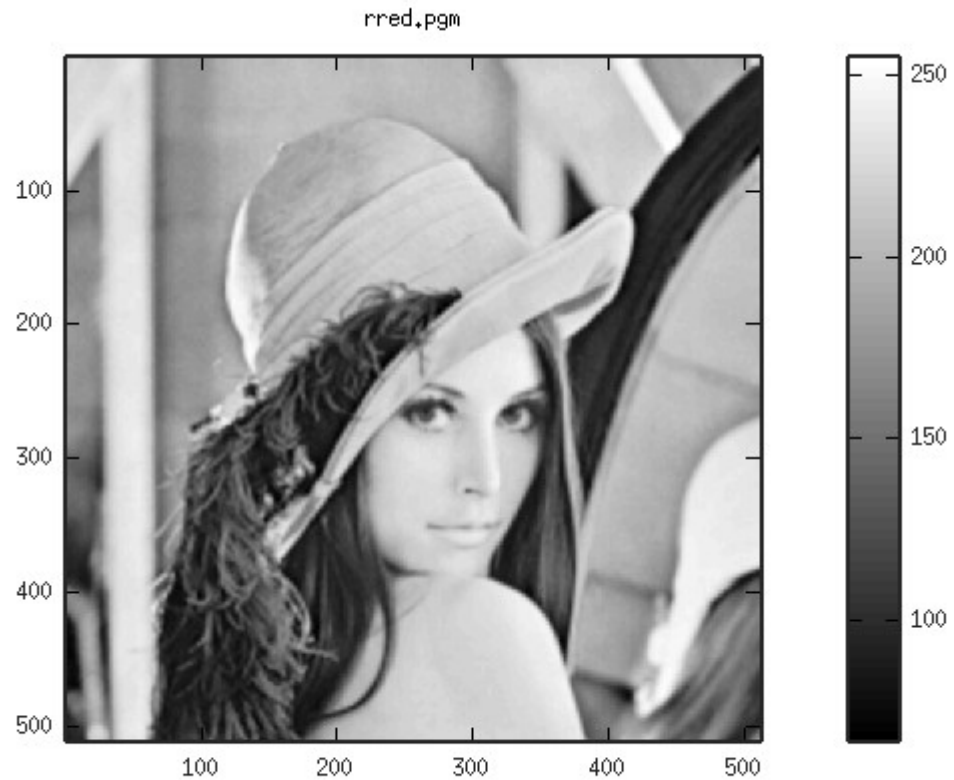


500 x 500 red subband lena



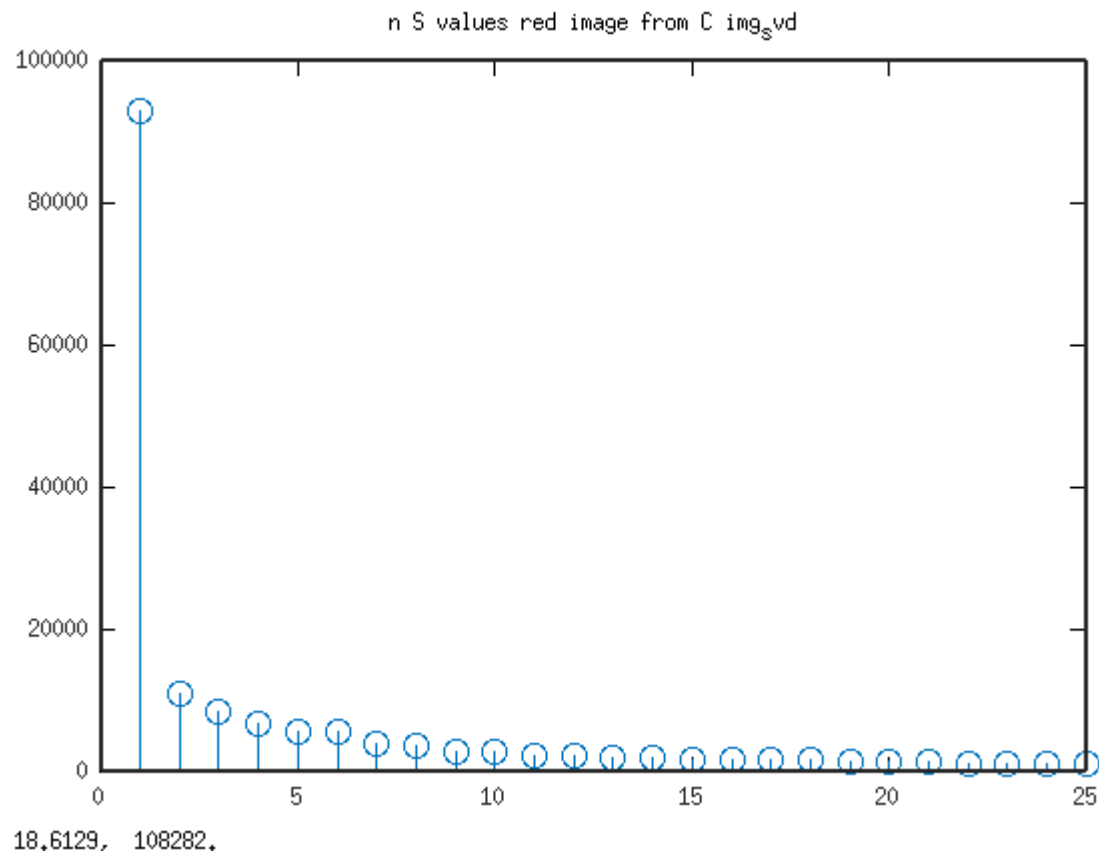
y2= 205,843

500 x 500 red subband lena reconstructed after performing KLT

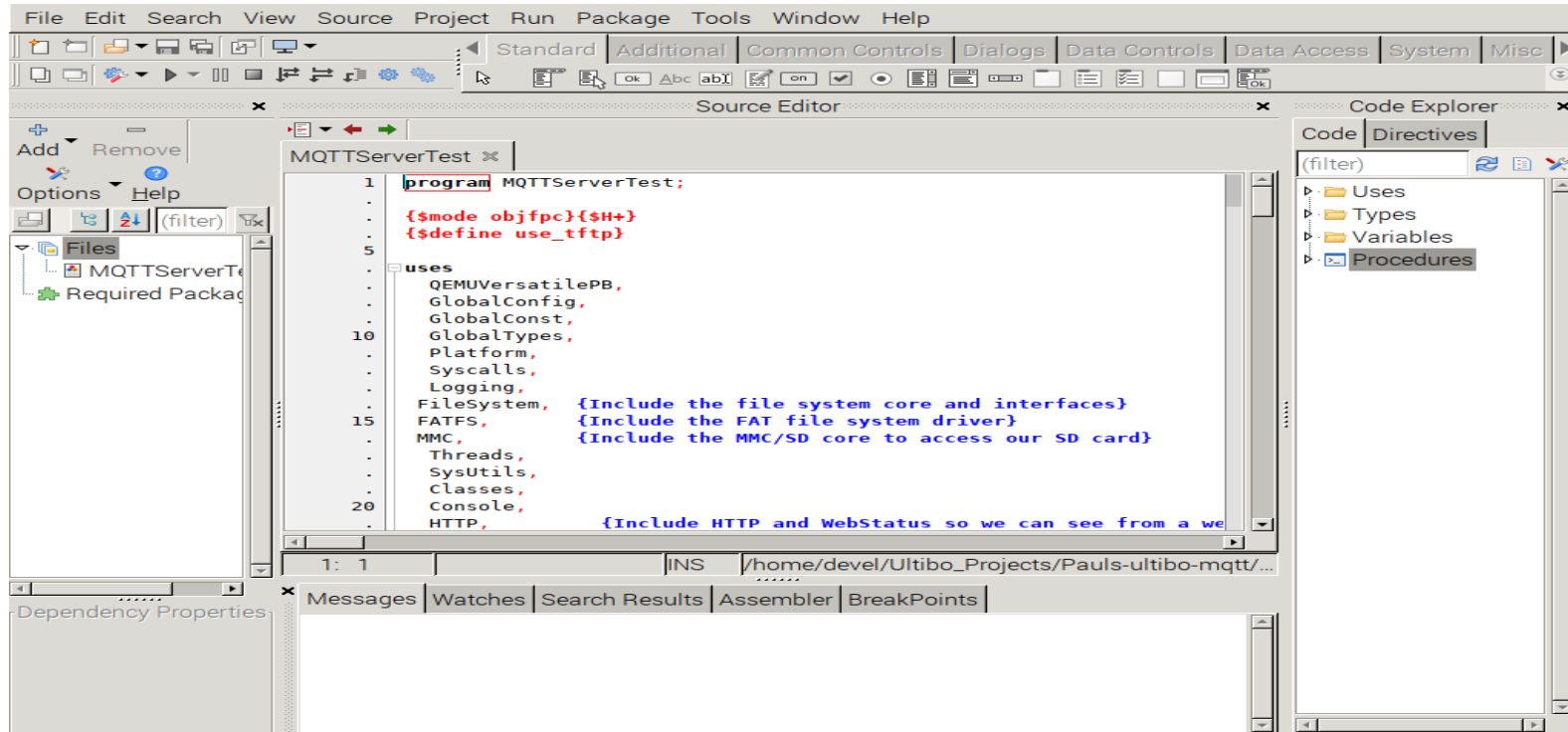


$\mu_2 = 52.8614$

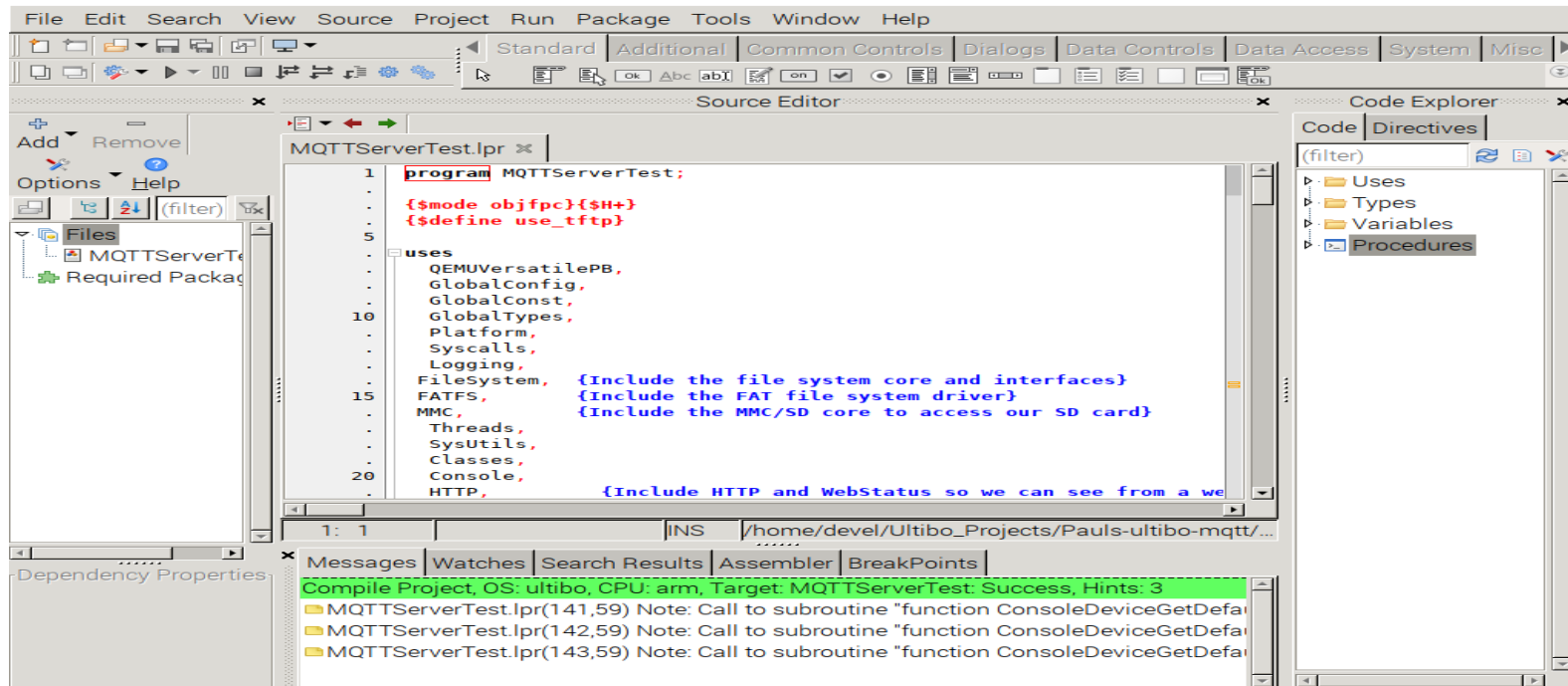
n S values red image from C img_svd



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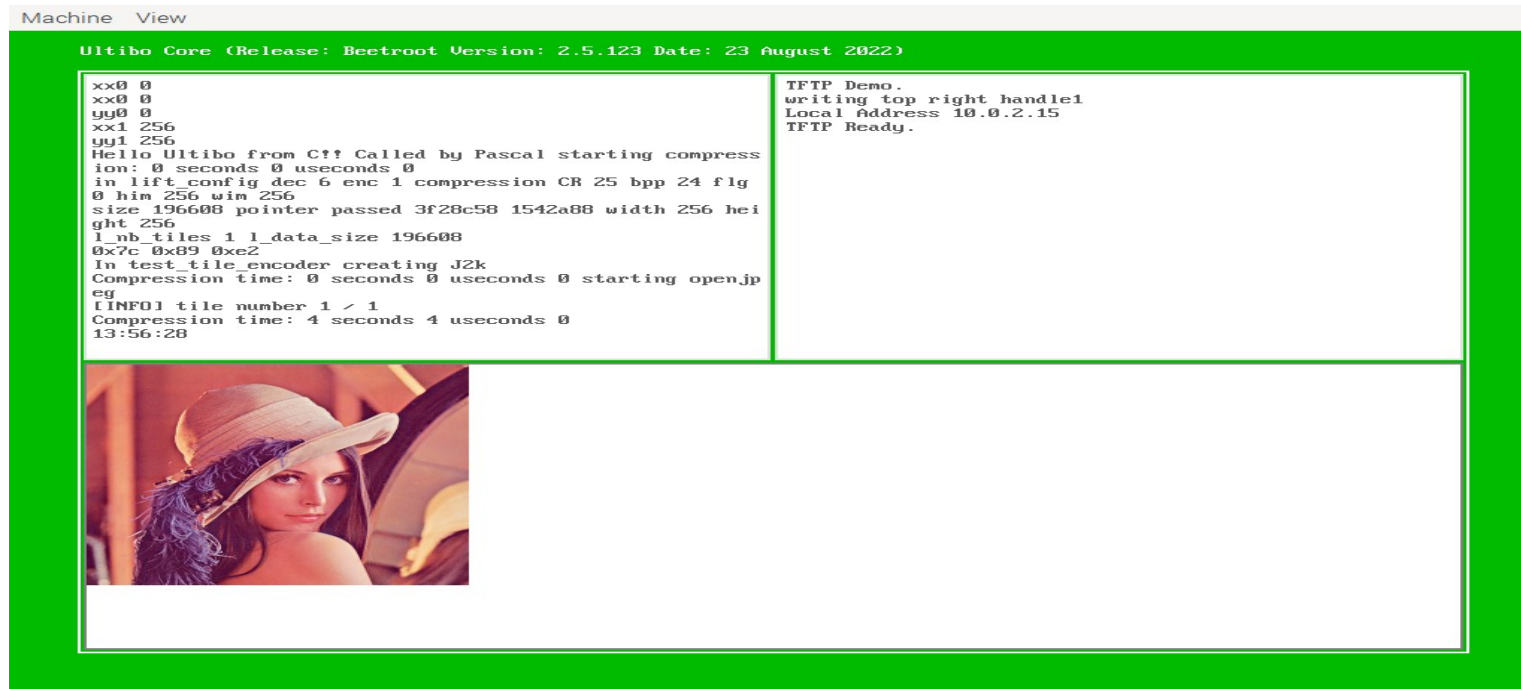


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Goal: Accessing 1of 5 RPi4B from the Over the Internet with graphical displays

```
devel@pi4-20:~/Ultibo_Projects/jpeg2000/QEMU $ ./startqemu.s
```



ATT Router

