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Contents: [Dobrica Pavlinu's random unstructured stuff]

- Dobrica Pavlinu's random unstructured stuff (esptool and raspberry pi)
- Dobrica Pavlinu's random unstructured stuff (esp-idf version)
 - ◆ Dobrica Pavlinu's random unstructured stuff (v4.2.2)
 - ◆ Dobrica Pavlinu's random unstructured stuff (v4.1.1 doesn't have ip_napt_enable)
- Dobrica Pavlinu's random unstructured stuff (enviroment)
- Dobrica Pavlinu's random unstructured stuff (IP_FORWARD enable in lwip)
- Dobrica Pavlinu's random unstructured stuff (build)
- Dobrica Pavlinu's random unstructured stuff (deploy to esp32 using esptool ttyUSB4)
- Dobrica Pavlinu's random unstructured stuff (serial)
- Dobrica Pavlinu's random unstructured stuff (webrepl)
- Dobrica Pavlinu's random unstructured stuff (ulx3s ppp)

esptool and raspberry pi

I found out that older versions of esptool (like the ones delivered by debian packages) don't work well on raspberry pi 2 and raspberry pi 4

```
root@pihdmi:/home/pi/linux-gpio-pinout# esptool -p /dev/ttyUSB0 read_mac
esptool.py v2.5.1
Serial port /dev/ttyUSB0
Connecting.....
```

A fatal error occurred: Failed to connect to Espressif device: Timed out waiting for packet header

```
root@pihdmi:/home/pi/linux-gpio-pinout# /nuc/esp32/esptool/esptool.py --port /dev/ttyUSB0 read_mac
esptool.py v3.2-dev
Serial port /dev/ttyUSB0
Connecting.....
Detecting chip type... ESP32
Chip is ESP32-D0WDQ6 (revision 1)
Features: WiFi, BT, Dual Core, 240MHz, VRef calibration in efuse, Coding Scheme None
Crystal is 40MHz
MAC: a4:cf:12:55:c5:60
Uploading stub...
Running stub...
Stub running...
MAC: a4:cf:12:55:c5:60
Hard resetting via RTS pin...
```

esp-idf version

```
dpavlin@nuc:/nuc/esp32/esp-idf$ git remote -v
origin https://github.com/espressif/esp-idf.git (fetch)
origin https://github.com/espressif/esp-idf.git (push)
```

```
dpavlin@nuc:/nuc/esp32/esp-idf$ git checkout -b v3.3-upy 9e70825d1e1cbf7988cf36981774300066580ea7
dpavlin@nuc:/nuc/esp32/esp-idf$ git submodule update --init --recursive
```

For latest micropython v4.3 leaves too little memory available for esp32ecp/ecp5

v4.2.2

```
('gc', gc.isenabled(), 'alloc', gc.mem_alloc(), 'free', gc.mem_free() )
gc True alloc 25632 free 85536
```

enough memory, but 50% packet loss for ping to remote ppp ip

v4.1.1 doesn't have ip_napt_enable

test alternative lwip lib

```
dpavlin@fpga:/esp32/esp-idf/components/lwip$ mv lwip lwip.old
```

```
dpavlin@fpga:/esp32/esp-idf/components/lwip$ git clone https://github.com/martin-ger/esp-lwip lwip
Cloning into 'lwip'...
```

```
remote: Enumerating objects: 49642, done.
```

```
remote: Total 49642 (delta 0), reused 0 (delta 0), pack-reused 49642
```

```
Receiving objects: 100% (49642/49642), 9.70 MiB | 14.52 MiB/s, done.
```

```
Resolving deltas: 100% (37485/37485), done.
```

it does work, but slowly:

```
dpavlin@nuc:/tmp/esp-lwip$ iperf3 -c 10.0.5.2
```

```
Connecting to host 10.0.5.2, port 5201
```

```
[ 5] local 192.168.3.40 port 52086 connected to 10.0.5.2 port 5201
```

| [ID] | Interval | | Transfer | Bitrate | Retr | Cwnd | |
|-------|------------|-----|-------------|---------------|------|-------------|--|
| [5] | 0.00-1.00 | sec | 102 KBytes | 833 Kbits/sec | 1 | 28.3 KBytes | |
| [5] | 1.00-2.00 | sec | 0.00 Bytes | 0.00 bits/sec | 10 | 14.1 KBytes | |
| [5] | 2.00-3.00 | sec | 82.0 KBytes | 673 Kbits/sec | 2 | 22.6 KBytes | |
| [5] | 3.00-4.00 | sec | 0.00 Bytes | 0.00 bits/sec | 0 | 28.3 KBytes | |
| [5] | 4.00-5.00 | sec | 0.00 Bytes | 0.00 bits/sec | 4 | 19.8 KBytes | |
| [5] | 5.00-6.00 | sec | 93.3 KBytes | 765 Kbits/sec | 4 | 18.4 KBytes | |
| [5] | 6.00-7.00 | sec | 0.00 Bytes | 0.00 bits/sec | 3 | 5.66 KBytes | |
| [5] | 7.00-8.00 | sec | 0.00 Bytes | 0.00 bits/sec | 0 | 15.6 KBytes | |
| [5] | 8.00-9.00 | sec | 63.6 KBytes | 522 Kbits/sec | 0 | 15.6 KBytes | |
| [5] | 9.00-10.00 | sec | 0.00 Bytes | 0.00 bits/sec | 2 | 5.66 KBytes | |

| [ID] | Interval | | Transfer | Bitrate | Retr | |
|-------|------------|-----|------------|---------------|------|----------|
| [5] | 0.00-10.00 | sec | 341 KBytes | 279 Kbits/sec | 26 | sender |
| [5] | 0.00-10.18 | sec | 216 KBytes | 174 Kbits/sec | | receiver |

enviroment

```
dpavlin@nuc:/nuc/uppy/micropython/ports/esp32$ cat env.sh
```

```
export PATH=/nuc/esp32/xtensa-esp32-elf/bin/:$PATH
```

```
export ESPIDF=/nuc/esp32/esp-idf/
```

IP_FORWARD enable in lwip

```
dpavlin@nuc:/nuc/upy/micropython/ports/esp32$ git diff
diff --git a/ports/esp32/Makefile b/ports/esp32/Makefile
index 756bc8f89..aa03a6370 100644
--- a/ports/esp32/Makefile
+++ b/ports/esp32/Makefile
@@ -494,7 +494,7 @@ ESPIDF_SPI_FLASH_O = $(patsubst %.c,%.o,$(wildcard $(ESPCOMP)/spi_flash/*.c))

ESPIDF_ULP_O = $(patsubst %.c,%.o,$(wildcard $(ESPCOMP)/ulp/*.c))

-$(BUILD)/$(ESPCOMP)/lwip/%.o: CFLAGS += -Wno-address -Wno-unused-variable -Wno-unused-but-set-variable
+$(BUILD)/$(ESPCOMP)/lwip/%.o: CFLAGS += -Wno-address -Wno-unused-variable -Wno-unused-but-set-variable
ESPIDF_LWIP_O = $(patsubst %.c,%.o,\
    $(wildcard $(ESPCOMP)/lwip/apps/dhcpserver/*.c) \
    $(wildcard $(ESPCOMP)/lwip/lwip/src/api/*.c) \
```

build

```
dpavlin@nuc:/nuc/upy/micropython/ports/esp32$ make V=1
```

...

```
xtensa-esp32-elf-size build-GENERIC/application.elf
   text    data    bss     dec     hex filename
1100148 275360 37372 1412880 158f10 build-GENERIC/application.elf
Create build-GENERIC/application.bin
/nuc/esp32/esp-idf/components/esptool_py/esptool/esptool.py --chip esp32 elf2image --flash_mode
esptool.py v2.8
Create build-GENERIC/firmware.bin
python3 makeimg.py build-GENERIC/bootloader.bin build-GENERIC/partitions.bin build-GENERIC/applic
bootloader      21360
partitions      3072
application     1375648
total           1441184
```

deploy to esp32 using esptool ttyUSB4

```
dpavlin@nuc:/nuc/upy/micropython/ports/esp32$ make V=1 PORT=/dev/ttyUSB4 deploy
Building with ESP IDF v3
python3 ../../py/makeversionhdr.py build-GENERIC/genhdr/mpversion.h
python3 ../../tools/makemanifest.py -o build-GENERIC/frozen_content.c -v "MPY_DIR=../../" -v "MPY_
Writing build-GENERIC/firmware.bin to the board
/nuc/esp32/esp-idf/components/esptool_py/esptool/esptool.py --chip esp32 --port /dev/ttyUSB4 --b
esptool.py v2.8
Serial port /dev/ttyUSB4
Connecting.....
Chip is ESP32D0WDQ6 (revision 1)
Features: WiFi, BT, Dual Core, 240MHz, VRef calibration in efuse, Coding Scheme None
Crystal is 40MHz
MAC: 24:0a:c4:31:d6:38
Uploading stub...
Running stub...
Stub running...
Changing baud rate to 460800
Changed.
Configuring flash size...
```

```
Auto-detected Flash size: 4MB
Compressed 1437088 bytes to 921637...
Wrote 1437088 bytes (921637 compressed) at 0x00001000 in 21.5 seconds (effective 535.8 kbit/s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
```

serial

```
dpavlin@nuc:/nuc/upy/micropython/ports/esp32$ microcom -p /dev/ttyUSB4
connected to /dev/ttyUSB4
Escape character: Ctrl-\
Type the escape character to get to the prompt.

>>>
MPY: soft reboot
AP config: ('192.168.4.1', '255.255.255.0', '192.168.4.1', '0.0.0.0')
network config: ('192.168.3.208', '255.255.255.0', '192.168.3.1', '192.168.3.1')
FTP server started on 192.168.4.1:21
FTP server started on 192.168.3.208:21
  esp32 mac: 24:0a:c4:31:d6:38 esp32upy
MicroPython v1.14-dirty on 2021-07-25; ESP32 module with ESP32
Type "help()" for more information.
>>> import machine
>>> machine.reset()
ets Jun  8 2016 00:22:57

rst:0xc (SW_CPU_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:2
load:0x3fff0018,len:4
load:0x3fff001c,len:4972
load:0x40078000,len:10600
load:0x40080400,len:5684
entry 0x400806bc
AP config: ('192.168.4.1', '255.255.255.0', '192.168.4.1', '0.0.0.0')
network config: ('192.168.3.208', '255.255.255.0', '192.168.3.1', '192.168.3.1')
FTP server started on 192.168.4.1:21
FTP server started on 192.168.3.208:21
  esp32 mac: 24:0a:c4:31:d6:38 esp32upy
MicroPython v1.14-dirty on 2021-07-25; ESP32 module with ESP32
Type "help()" for more information.
```

webrepl

- https://github.com/Hermann-SW/webrepl/blob/master/webrepl_client.py -- provide python repl without using usb serial port
- <https://github.com/kost/webrepl-python>

ulx3s ppp

- <https://github.com/emard/esp32ppp>
- <https://github.com/micropython/micropython/issues/5369>