

Lamobo/BananaPi R1

[http://linux-sunxi.org/Lamobo\\_R1](http://linux-sunxi.org/Lamobo_R1)

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## upgrade to unsupported armbian

This board was last supported on jessie, but it's fully supported in upstream so I did upgrade to latest Armbian as of 2021-05-29.

### u-boot

sdcard already had u-boot installed, so I didn't have to touch this in first step. To update u-boot do following:

```
root@r1:/home/dpavlin# apt install u-boot-sunxi
```

```
root@r1:/home/dpavlin# dd conv=fsync,notrunc if=/usr/lib/u-boot/Lamobo_R1/u-boot-sunxi-with-spl.b
```

```
449+1 records in
449+1 records out
460103 bytes (460 kB, 449 KiB) copied, 0.0449233 s, 10.2 MB/s
```

## distribution

First, I did distribution update to stretch and buster and than added

```
root@r1:/home/dpavlin# cat /etc/apt/sources.list.d/armbian.list
deb http://beta.armbian.com buster main
```

## kernel

and installed latest sunxi kernel image

```
apt install linux-image-edge-sunxi
```

After reboot I was greeted with new kernel

```
root@r1:/home/dpavlin# uname -a
Linux r1 5.12.7-sunxi #trunk.33 SMP Fri May 28 07:03:36 UTC 2021 armv7l GNU/Linux
```

## configure switch

<https://www.kernel.org/doc/html/latest/networking/dsa/b53.html>

```
root@r1:/home/dpavlin# cat /etc/network/interfaces.d/br0
auto br0
iface br0 inet dhcp
#iface br0 inet manual
#       address 192.168.1.1
#       netmask 255.255.255.0
       bridge_ports eth0 wan lan1 lan2 lan3 lan4
       post-up for i in `seq 0 4`; do ip link set up dev lan${i}; done ; ip link set up dev wlan
       bridge_stp off
       bridge_waitport 0
       bridge_fd 0
```

Ports are (left-to-right, looking from back of board starting at edge towards hdmi connector):

```
br0: port 3(lan1) entered disabled state
br0: port 4(lan2) entered blocking state
br0: port 4(lan2) entered forwarding state
br0: port 4(lan2) entered disabled state
br0: port 5(lan3) entered blocking state
br0: port 5(lan3) entered forwarding state
br0: port 5(lan3) entered disabled state
```

```
br0: port 6(lan4) entered blocking state
br0: port 6(lan4) entered forwarding state
br0: port 6(lan4) entered disabled state
br0: port 2(wan) entered blocking state
br0: port 2(wan) entered forwarding state
```

## switch connects all ports on boot

<https://github.com/armbian/build/issues/511#issuecomment-258647387>

## DSA config on armbian for r1

- <https://github.com/armbian/build/issues/511>

## uart

Connect your UART adapter here:

UART0-RX: J13-P01

UART0-TX: J13-P02

GND: J12-P08

				GND	TX	RX
	J12	o	o	o	o	o
{SD slot}		o	o	o	o	

## switch

<https://www.mail-archive.com/netdev@vger.kernel.org/msg150526.html>

## port mirroring

<https://www.mail-archive.com/netdev@vger.kernel.org/msg150526.html>

```
# ingress
tc qdisc add dev eth1 handle ffff: ingress
tc filter add dev eth1 parent ffff:
    matchall skip_sw
    action mirred egress mirror
    dev eth2
# egress
tc qdisc add dev eth1 handle 1: root prio
tc filter add dev eth1 parent 1:
    matchall skip_sw
    action mirred egress mirror
    dev eth2
```

# usb otg

<http://git.rot13.org/?p=usb-otg;a=summary>

# usbproxy

make sure that there are no other usb modules loaded (libcomposite or g\_\*)

# mitm usb otg machine

```
dpavlin@r1:~/USBProxy$ git remote -v
origin https://github.com/dominicgs/USBProxy (fetch)
origin https://github.com/dominicgs/USBProxy (push)

dpavlin@r1:~/USBProxy/src/build$ sudo usb-mitm -l -v 058f -p 6387 -P PacketFilter_MassStorage
Loading plugins from /usr/local/lib/USBProxy/
vendorId=058f
productId=6387
cleaning up /tmp
removing 1
Made directory /tmp/gadget-SO0BVj for gadget
UnblockPassword=
Printing Config data
    Strings: 4
        DeviceProxy: DeviceProxy_LibUSB
        HostProxy: HostProxy_GadgetFS
        productId: 6387
        vendorId: 058f
    Vectors: 1
        Plugins:
            PacketFilter_StreamLog
            PacketFilter_MassStorage
Pointer: 1
    PacketFilter_StreamLog::file: 0xb6d779f0
Device: 12 01 00 02 00 00 00 40 8f 05 87 63 00 01 01 02 03 01
Manufacturer: JetFlash
Product:      Mass Storage Device
Serial:      GUYOBH DU
    *Config(1): 09 02 20 00 01 01 00 80 32
        Interface(0):
            *Alt(0): 09 04 00 00 02 08 06 50 00
                EP(01): 07 05 01 02 00 02 00
                EP(82): 07 05 82 02 00 02 00
HS Qualifier: 0a 06 00 02 00 00 00 40 01 00
    Config(1): 09 07 20 00 01 01 00 80 32
        Interface(0):
            *Alt(0): 09 04 00 00 02 08 06 50 00
                EP(01): 07 05 01 02 40 00 00
                EP(82): 07 05 82 02 40 00 00
searching in [/tmp/gadget-SO0BVj]
Starting injector thread (14796) for [Injector].
Injector In FD[1/1]: 3
Starting setup writer thread (14799) for EP00.
Starting setup reader thread (14797) for EP00.
[80 06 00 03 00 00 ff 00]
[80 06 00 03 00 00 04 00]: 04 03 09 04
[80 06 02 03 09 04 ff 00]
[80 06 02 03 09 04 28 00]:
    28 03 4d 00 61 00 73 00 73 00 20 00 53 00 74 00 6f 00 72 00 61 00 67 00 65 00 20 00 44 00
    76 00 69 00 63 00 65 00
[80 06 01 03 09 04 ff 00]
```

```
[80 06 01 03 09 04 12 00]: 12 03 4a 00 65 00 74 00 46 00 6c 00 61 00 73 00 68 00
[80 06 03 03 09 04 ff 00]
[80 06 03 03 09 04 12 00]: 12 03 47 00 55 00 59 00 4f 00 42 00 48 00 44 00 55 00
[00 09 01 00 00 00 00 00]
Opened EP01
Opened EP82
Starting writer thread (14802) for EP01.
Starting reader thread (14803) for EP82.
Starting writer thread (14804) for EP82.
Starting reader thread (14801) for EP01.
[a1 fe 00 00 00 00 01 00]
[a1 fe 00 00 00 00 00 00]
01[31]: 55 53 42 43 01 00 00 00 24 00 00 00 80 00 06 12 00 00 00 24 00 00 00 00 00 00 00 00 00 00 00 00
CBW: (12), tag: 01 00 00 00

[80 06 03 03 09 04 ff 00]
[80 06 03 03 09 04 12 00]: 12 03 47 00 55 00 59 00 4f 00 42 00 48 00 44 00 55 00
[00 09 01 00 00 00 00 00]
```

## original target device

```
dpavlin@nuc:~$ journalctl -t kernel -f
Sep 01 11:10:04 nuc kernel: usb 2-4.4.2: new high-speed USB device number 45 using xhci_hcd
Sep 01 11:10:04 nuc kernel: usb 2-4.4.2: New USB device found, idVendor=058f, idProduct=6387
Sep 01 11:10:04 nuc kernel: usb 2-4.4.2: New USB device strings: Mfr=1, Product=2, SerialNumber=3
Sep 01 11:10:04 nuc kernel: usb 2-4.4.2: Product: Mass Storage Device
Sep 01 11:10:04 nuc kernel: usb 2-4.4.2: Manufacturer: JetFlash
Sep 01 11:10:04 nuc kernel: usb 2-4.4.2: SerialNumber: GUYOBHDU
Sep 01 11:10:04 nuc kernel: usb-storage 2-4.4.2:1.0: USB Mass Storage device detected
Sep 01 11:10:04 nuc kernel: scsi host5: usb-storage 2-4.4.2:1.0

# BUT!

dpavlin@nuc:~$ sudo fdisk -l /dev/sdb
fdisk: cannot open /dev/sdb: No medium found
```

## WiringPi

```
dpavlin@r1:~/BPI-WiringPi2$ git remote -v
lanefu https://github.com/lanefu/WiringOtherPi (fetch)
lanefu https://github.com/lanefu/WiringOtherPi (push)
origin https://github.com/BPI-SINOVOIP/BPI-WiringPi2 (fetch)
origin https://github.com/BPI-SINOVOIP/BPI-WiringPi2 (push)
```

```
dpavlin@r1:~/BPI-WiringPi2$ gpio readall
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| BCM | wPi | Name | Mode | V | Physical | V | Mode | Name | wPi | BCM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| | | 3.3v | | | 1 || 2 | | | 5v | | | |
| 12 | 8 | SDA.0 | IN | 0 | 3 || 4 | | | 5V | | | |
| 11 | 9 | SCL.0 | IN | 0 | 5 || 6 | | | 0v | | | |
| 6 | 7 | GPIO.7 | IN | 0 | 7 || 8 | 0 | IN | TxD3 | 15 | 13 |
| | | 0v | | | 9 || 10 | 0 | IN | RxD3 | 16 | 14 |
| 1 | 0 | RxD2 | IN | 0 | 11 || 12 | 0 | IN | GPIO.1 | 1 | 110 |
| 0 | 2 | TxD2 | IN | 0 | 13 || 14 | | | 0v | | | |
| 3 | 3 | CTS2 | IN | 0 | 15 || 16 | 0 | IN | GPIO.4 | 4 | 68 |
```

		3.3v			17	18	0	IN	GPIO.5	5	71
64	12	MOSI	IN	0	19	20			0v		
65	13	MISO	IN	0	21	22	0	IN	RTS2	6	2
66	14	SCLK	IN	0	23	24	0	IN	CE0	10	67
		0v			25	26	0	IN	GPIO.11	11	21
19	30	SDA.1	IN	0	27	28	0	IN	SCL.1	31	18
7	21	GPIO.21	IN	0	29	30			0v		
8	22	GPIO.22	IN	0	31	32	0	IN	RTS1	26	200
9	23	GPIO.23	IN	0	33	34			0v		
10	24	GPIO.24	IN	0	35	36	0	IN	CTS1	27	201
20	25	GPIO.25	IN	0	37	38	0	IN	TxD1	28	198
		0v			39	40	0	IN	RxD1	29	199
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+											
BCM	wPi	Name	Mode	V	Physical	V	Mode	Name	wPi	BCM	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+											
BCM   wPi   Name   Mode   V   Physical   V   Mode   Name   wPi   BCM											
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+											
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----											
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----											
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+											

## TMP75

```
root@r1:/etc/telegraf# i2cdetect -y 1
 0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- 49 -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
```

## userland

- <https://github.com/ManuelSchneid3r/RaspberryPi/blob/master/sensors/src/tmp.c>

```
dpavlin@r1:~$ cc tmp.c -o tmp -lm
dpavlin@r1:~$ sudo ./tmp /dev/i2c-1 0x49
21.5
```

## kernel hwmomn lm75 driver

```
root@r1:~# echo lm75 0x49 > /sys/bus/i2c/devices/i2c-1/new_device

root@r1:~# dmesg | tail -2
[68352.599623] lm75 1-0049: hwmon1: sensor 'lm75'
[68352.599719] i2c i2c-1: new_device: Instantiated device lm75 at 0x49

root@r1:/sys/bus/i2c/devices/i2c-1# sensors
sun4i_ts-isa-0000
Adapter: ISA adapter
SoC temperature: +44.4Â°C
```

```
lm75-i2c-1-49
Adapter: mv64xxx_i2c adapter
temp1:      +22.0Â°C (high = +80.0Â°C, hyst = +75.0Â°C)
```

## network performance

### kernel 3.4

```
root@r1:~# uname -a
Linux r1 3.4.113-sun7i #23 SMP PREEMPT Wed Jun 14 23:57:45 CEST 2017 armv7l GNU/Linux
```

```
root@r1:~# iperf3 --reverse --client nuc
Connecting to host nuc, port 5201
Reverse mode, remote host nuc is sending
[ 4] local 192.168.3.238 port 58203 connected to 192.168.3.40 port 5201
[ ID] Interval          Transfer      Bandwidth
[ 4] 0.00-1.00    sec   107 MBytes   897 Mbits/sec
[ 4] 1.00-2.00    sec   110 MBytes   923 Mbits/sec
[ 4] 2.00-3.00    sec   111 MBytes   935 Mbits/sec
[ 4] 3.00-4.00    sec   107 MBytes   894 Mbits/sec
[ 4] 4.00-5.00    sec   111 MBytes   927 Mbits/sec
[ 4] 5.00-6.00    sec   110 MBytes   922 Mbits/sec
[ 4] 6.00-7.00    sec   111 MBytes   928 Mbits/sec
[ 4] 7.00-8.00    sec   111 MBytes   935 Mbits/sec
[ 4] 8.00-9.00    sec   111 MBytes   928 Mbits/sec
[ 4] 9.00-10.00   sec   111 MBytes   931 Mbits/sec
-----
[ ID] Interval          Transfer      Bandwidth      Retr
[ 4] 0.00-10.00   sec   1.08 GBytes   924 Mbits/sec  147
[ 4] 0.00-10.00   sec   1.07 GBytes   922 Mbits/sec
                                     sender
                                     receiver

iperf Done.
```

```
root@r1:~# iperf3 --client nuc
Connecting to host nuc, port 5201
[ 4] local 192.168.3.238 port 58205 connected to 192.168.3.40 port 5201
[ ID] Interval          Transfer      Bandwidth      Retr  Cwnd
[ 4] 0.00-1.00    sec   51.3 MBytes   428 Mbits/sec    0   239 KBytes
[ 4] 1.00-2.01    sec   52.5 MBytes   436 Mbits/sec    0   240 KBytes
[ 4] 2.01-3.02    sec   52.5 MBytes   436 Mbits/sec    0   245 KBytes
[ 4] 3.02-4.01    sec   50.0 MBytes   424 Mbits/sec    0   246 KBytes
[ 4] 4.01-5.02    sec   51.2 MBytes   429 Mbits/sec    0   247 KBytes
[ 4] 5.02-6.02    sec   52.5 MBytes   439 Mbits/sec    0   250 KBytes
[ 4] 6.02-7.03    sec   51.2 MBytes   427 Mbits/sec    0   253 KBytes
[ 4] 7.03-8.00    sec   48.8 MBytes   418 Mbits/sec    0   256 KBytes
[ 4] 8.00-9.02    sec   52.5 MBytes   432 Mbits/sec    0   256 KBytes
[ 4] 9.02-10.01   sec   51.2 MBytes   435 Mbits/sec    0   256 KBytes
-----
[ ID] Interval          Transfer      Bandwidth      Retr
[ 4] 0.00-10.01   sec   514 MBytes   431 Mbits/sec    0
[ 4] 0.00-10.01   sec   514 MBytes   431 Mbits/sec
                                     sender
                                     receiver
```

### kernel 4.13

```
root@r1:~# uname -a
Linux r1 4.13.10-sunxi #57 SMP Mon Oct 30 00:08:27 CET 2017 armv7l GNU/Linux
```

```

root@r1:~# iperf3 --client nuc
Connecting to host nuc, port 5201
[ 4] local 192.168.3.238 port 59520 connected to 192.168.3.40 port 5201
[ ID] Interval            Transfer           Bandwidth          Retr  Cwnd
[ 4]  0.00-1.00          sec  67.9 MBytes      567 Mb/s           0     765 KBytes
[ 4]  1.00-2.01          sec  82.1 MBytes      687 Mb/s           0     840 KBytes
[ 4]  2.01-3.01          sec  65.7 MBytes      547 Mb/s           0     1.13 MBytes
[ 4]  3.01-4.02          sec  80.0 MBytes      669 Mb/s           0     1.13 MBytes
[ 4]  4.02-5.00          sec  76.2 MBytes      648 Mb/s           0     1.24 MBytes
[ 4]  5.00-6.00          sec  81.2 MBytes      681 Mb/s           0     1.24 MBytes
[ 4]  6.00-7.06          sec  82.5 MBytes      656 Mb/s           0     1.33 MBytes
[ 4]  7.06-8.00          sec  80.0 MBytes      712 Mb/s           0     1.33 MBytes
[ 4]  8.00-9.00          sec  78.8 MBytes      659 Mb/s           0     1.61 MBytes
[ 4]  9.00-10.00         sec  83.8 MBytes      702 Mb/s           0     2.08 MBytes
-----
[ ID] Interval            Transfer           Bandwidth          Retr
[ 4]  0.00-10.00         sec  778 MBytes      653 Mb/s           0
[ 4]  0.00-10.00         sec  775 MBytes      650 Mb/s
sender
receiver

iperf Done.

```

```

root@r1:~# iperf3 --reverse --client nuc
Connecting to host nuc, port 5201
Reverse mode, remote host nuc is sending
[ 4] local 192.168.3.238 port 59524 connected to 192.168.3.40 port 5201
[ ID] Interval            Transfer           Bandwidth          Retr
[ 4]  0.00-1.00          sec  98.0 MBytes      822 Mb/s           0
[ 4]  1.00-2.00          sec  112 MBytes      933 Mb/s           0
[ 4]  2.00-3.00          sec  107 MBytes      904 Mb/s           0
[ 4]  3.00-4.00          sec  107 MBytes      898 Mb/s           0
[ 4]  4.00-5.00          sec  108 MBytes      904 Mb/s           0
[ 4]  5.00-6.00          sec  108 MBytes      903 Mb/s           0
[ 4]  6.00-7.00          sec  108 MBytes      904 Mb/s           0
[ 4]  7.00-8.00          sec  108 MBytes      904 Mb/s           0
[ 4]  8.00-9.00          sec  108 MBytes      904 Mb/s           0
[ 4]  9.00-10.00         sec  107 MBytes      899 Mb/s           0
-----
[ ID] Interval            Transfer           Bandwidth          Retr
[ 4]  0.00-10.00         sec  1.05 GBytes      900 Mb/s           69
[ 4]  0.00-10.00         sec  1.05 GBytes      898 Mb/s
sender
receiver

```

## kernel 5.12.7

```

dpavlin@r1:~$ uname -a
Linux r1 5.12.7-sunxi #trunk.33 SMP Fri May 28 07:03:36 UTC 2021 armv7l GNU/Linux

```

```

dpavlin@r1:~$ iperf3 -c nuc
Connecting to host nuc, port 5201
[ 5] local 192.168.3.238 port 50136 connected to 192.168.3.40 port 5201
[ ID] Interval            Transfer           Bitrate            Retr  Cwnd
[ 5]  0.00-1.02          sec  41.9 MBytes      346 Mb/s           0     239 KBytes
[ 5]  1.02-2.02          sec  53.8 MBytes      448 Mb/s           0     266 KBytes
[ 5]  2.02-3.00          sec  42.5 MBytes      363 Mb/s           0     266 KBytes
[ 5]  3.00-4.02          sec  53.8 MBytes      445 Mb/s           0     277 KBytes
[ 5]  4.02-5.01          sec  53.8 MBytes      456 Mb/s           0     325 KBytes
[ 5]  5.01-6.02          sec  48.1 MBytes      400 Mb/s           0     386 KBytes
[ 5]  6.02-7.03          sec  48.8 MBytes      405 Mb/s           0     386 KBytes
[ 5]  7.03-8.00          sec  46.2 MBytes      397 Mb/s           0     386 KBytes
[ 5]  8.00-9.02          sec  53.8 MBytes      443 Mb/s           0     393 KBytes
[ 5]  9.02-10.00         sec  51.2 MBytes      438 Mb/s           0     393 KBytes
-----

```



[ ID]	Interval		Transfer	Bitrate	Retr	
[ 5]	0.00-10.00	sec	494 MBytes	414 Mbites/sec	0	sender
[ 5]	0.00-10.01	sec	494 MBytes	414 Mbites/sec		receiver

iperf Done.

dpavlin@r1:~\$ iperf3 -R -c nuc

Connecting to host nuc, port 5201

Reverse mode, remote host nuc is sending

[ 5] local 192.168.3.238 port 50140 connected to 192.168.3.40 port 5201

[ ID]	Interval		Transfer	Bitrate
[ 5]	0.00-1.01	sec	66.9 MBytes	559 Mbites/sec
[ 5]	1.01-2.00	sec	69.8 MBytes	588 Mbites/sec
[ 5]	2.00-3.00	sec	66.8 MBytes	560 Mbites/sec
[ 5]	3.00-4.00	sec	67.6 MBytes	567 Mbites/sec
[ 5]	4.00-5.00	sec	67.6 MBytes	568 Mbites/sec
[ 5]	5.00-6.00	sec	65.3 MBytes	548 Mbites/sec
[ 5]	6.00-7.00	sec	66.5 MBytes	558 Mbites/sec
[ 5]	7.00-8.00	sec	65.4 MBytes	549 Mbites/sec
[ 5]	8.00-9.00	sec	66.7 MBytes	560 Mbites/sec
[ 5]	9.00-10.00	sec	65.2 MBytes	547 Mbites/sec

[ ID]	Interval		Transfer	Bitrate	Retr	
[ 5]	0.00-10.01	sec	672 MBytes	563 Mbites/sec	57	sender
[ 5]	0.00-10.00	sec	668 MBytes	560 Mbites/sec		receiver

iperf Done.