Olimex Lime 2 ethernet paquet loss issue report

Author : IACA Electronique

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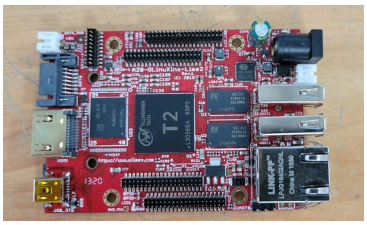
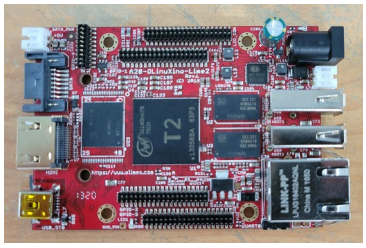
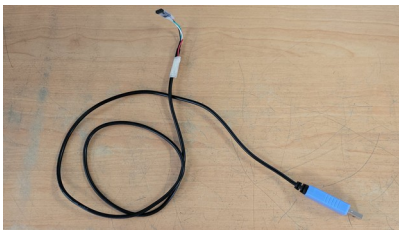
Materials

Name	Image	Description
Olimex Lime 2 (1)		T2-OlinuXino-LIME2-e16Gs16M-IND Rev.L
Olimex Lime 2 (2)		T2-OlinuXino-LIME2-e16Gs16M-IND Rev.L
Serial USB debug		
Switch A		TP-LINK TL-SG108 8 Port Gigabit switch
Switch B		NETGEAR GS108 v3 8 Port Gigabit switch

Switch C		PEABIRD PEAB-SW8 8 Port 10/100Mbps switch
32 GB SD card x2		32 GB GIGASTONE MLC SD Card
Power supply		AC/DC Adaptater Model KE024A OUTPUT : DC5.0V – 3A

Non materials

- A20-OlinuXino-bullseye-base-20231106-081613.img.7z
- Commands : *dd, 7z*, *ping*, *grep* and *ethtool*

Procedure used

On PC using Ubuntu 22.04 :

1. Download file A20-OlinuXino-bullseye-base-20231106-081613.img.7z
2. Decompress the downloaded file :
   `7z x A20-OlinuXino-bullseye-base-20231106-081613.img.7z`
3. Flash SD card with A20-OlinuXino-bullseye-base-20231106-081613.img using *dd* command :
   `dd if=A20-OlinuXino-bullseye-base-20231106-081613.img of=/dev/<device> bs=4M status=progress`
4. Unplug SD card from PC
5. Plug debug serial cable on USB PC
6. Prepare terminal for debug : `screen /dev/ttyUSB0 115200`

On Olimex board :

1. Plug SD card
2. Plug serial debug on board debug port
3. Plug power supply
4. Once board request credentials, type : olimex [enter] olimex [enter]
5. Plug Ethernet to switch A
6. Get link speed and report it in table : `sudo ethtool eth0 | grep Speed`
7. Execute command : `ping -c 100 <local target ip>`
8. Get loss rate and report it in table

```
64 bytes from 10.1.1.30: icmp_seq=7 ttl=6   me=0.680 ms
64 bytes from 10.1.1.30: icmp_seq=8 ttl=    time=0.731 ms
^C
--- 10.1.1.30 ping statistics ---
10 packets transmitted, 10 received, 10% packet loss, time 7034ms
rtt min/avg/max/mdev = 0.635/0.732/0.921/0.083 ms
```

9. Execute command : `ping -c 100 -s 4000 <local target ip>`
10. Get loss rate and report it in table
11. Start again from step 5 but with switch B and C
12. Start again from step 5 but with switch B and C but after step 5, force speed link to 100Mbps : `sudo ethtool -s eth0 speed 100 duplex full autoneg on`

Context information

- Tests were carried on two totally different network, only switch have been kept.
- The SD cards are not the same between Olimex boards 1 and 2 (but they have the same specs, provider and image).
- The image used has not been modified.
- Tests were carried out at different locations.

Result

Board	Switch	Link speed	Loss rate (ping 64bits)	Loss rate (ping 4048bits)
1	A (1Gbps)	1Gbps	32%	100%
1	B (1Gbps)	1Gbps	56%	100%
1	C (100Mbps)	100Mbps	0%	0%
1	A (1Gbps)	100Mbps	0%	0%
1	B (1Gbps)	100Mbps	0%	0%
2	A (1Gbps)	1Gbps	8%	100%
2	B (1Gbps)	1Gbps	18%	100%
2	C (100Mbps)	100Mbps	0%	0%
2	A (1Gbps)	100Mbps	0%	0%
2	B (1Gbps)	100Mbps	0%	0%

Observation

It appears that a 1 Gbps link speed is the source of the problem, as everything functions well when Ethernet is configured at 100 Mbps.

When the issue occurs, the board becomes unusable; it's impossible to execute basic commands over the internet or a local network device. For example, the board fails to update repositories (e.g., running `apt update`).

This issue seems to be known by Olimex, as their wiki includes the following advice :

"A simple general workaround is to avoid speeds showing package loss, either by advertising only lower speeds, or by turning off auto-negotiation and setting one specific lower speed, or doing similar advertising/fixation at the peer host. [...]"

Source : https://linux-sunxi.org/Olimex_A20-OLinuXino-Lime2