



Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης  
Πολυτεχνική Σχολή

## Δίκτυα Υπολογιστών II

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# Contents

1	Image	1
2	Audio	3
3	Ithakicopter TCP version	5
4	Car fault diagnostics	7

## 1 Image

Αξίζει να σημειωθεί, μιας και δεν φαίνεται στα wireshark captures, ότι είχαμε δημιουργήσει ένα custom filter: **host 155.207.18.208 and udp** το οποίο το επιλέγαμε προτού αρχίσουμε το capturing των πακέτων.

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 19:40:03.768368594	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 19:40:05.420911957	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 19:40:05.448599969	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 19:40:06.553035719	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 19:40:06.554043532	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 19:40:08.677328824	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 19:40:08.678744345	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 19:40:10.160612614	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 19:40:10.166538398	192.168.1.50	155.207.18.208	UDP	55	48048 → 38048 Len=13
10	2020-11-23 19:40:10.545951887	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
11	2020-11-23 19:40:10.583952179	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
12	2020-11-23 19:40:10.621947221	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
13	2020-11-23 19:40:10.659929802	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
14	2020-11-23 19:40:10.698502992	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
15	2020-11-23 19:40:10.736149860	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
16	2020-11-23 19:40:10.774405672	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
17	2020-11-23 19:40:10.812627546	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
18	2020-11-23 19:40:10.850626737	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
19	2020-11-23 19:40:10.888953357	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
20	2020-11-23 19:40:10.926627034	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
21	2020-11-23 19:40:10.965135893	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
22	2020-11-23 19:40:11.003159788	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
23	2020-11-23 19:40:11.041135160	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
24	2020-11-23 19:40:11.079643172	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
▶ Frame 7: 47 bytes on wire (376 bits), 47 bytes captured (376 bits) on interface enp2s0, id 0						
▶ Ethernet II, Src: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6), Dst: zte_1a:b4:0a (d4:76:ea:1a:b4:0a)						
▶ Internet Protocol Version 4, Src: 192.168.1.50, Dst: 155.207.18.208						
▶ User Datagram Protocol, Src Port: 48048, Dst Port: 38048						
▼ Data (5 bytes)						
Data: 4533343538						
[Length: 5]						
0000	d4 76 ea 1a b4 0a 40 b0	34 96 9d b6 08 00 45 00	·v·····@·4·····E·			
0010	00 21 03 1a 40 00 40 11	c7 38 c0 a8 01 32 9b cf	·!···@·@·8···2··			
0020	12 d0 bb b0 94 a0 00 0d	8d a0 45 33 34 35 38	·········E3458			

Figure 1: Echo request code

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 19:40:03.768368594	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 19:40:05.420911957	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 19:40:05.448599969	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 19:40:06.553035719	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 19:40:06.554043532	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 19:40:08.677328824	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 19:40:08.678744345	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 19:40:10.160612614	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 19:40:10.166538398	192.168.1.50	155.207.18.208	UDP	55	48048 → 38048 Len=13
10	2020-11-23 19:40:10.545951887	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
11	2020-11-23 19:40:10.583952179	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
12	2020-11-23 19:40:10.621947221	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
13	2020-11-23 19:40:10.659929802	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
14	2020-11-23 19:40:10.698502992	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
15	2020-11-23 19:40:10.736149860	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
16	2020-11-23 19:40:10.774405672	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
17	2020-11-23 19:40:10.812627546	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
18	2020-11-23 19:40:10.850626737	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
19	2020-11-23 19:40:10.888953357	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
20	2020-11-23 19:40:10.926627034	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
21	2020-11-23 19:40:10.965135893	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
22	2020-11-23 19:40:11.003159788	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
23	2020-11-23 19:40:11.041135160	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
24	2020-11-23 19:40:11.079643172	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024

▶ Frame 8: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface enp2s0, id 0  
 ▶ Ethernet II, Src: zte\_1a:b4:0a (d4:76:ea:1a:b4:0a), Dst: HewlettP\_96:9d:b6 (40:b0:34:96:9d:b6)  
 ▶ Internet Protocol Version 4, Src: 155.207.18.208, Dst: 192.168.1.50  
 ▶ User Datagram Protocol, Src Port: 58048, Dst Port: 48048  
 ▼ Data (32 bytes)  
 Data: 505354415254203232d31312d323032302031393a34303a3131205053544f50  
 [Length: 32]

```

0000  40 b0 34 96 9d b6 d4 76  ea 1a b4 0a 08 00 45 00  @ 4---v---E-
0010  00 3c c1 05 00 00 79 11  10 32 9b cf 12 d0 c0 a8  <---y---2---
0020  01 32 e2 c0 bb b0 00 28  57 e7 50 53 54 41 52 54  -2---( WPSTART
0030  20 32 33 2d 31 31 2d 32  30 32 30 20 31 39 3a 34  23-11-2 020 19:4
0040  30 3a 31 31 20 50 53 54  4f 50 0:11 PST OP
  
```

Figure 2: Echo response time

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 19:40:03.768368594	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 19:40:05.420911957	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 19:40:05.448599969	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 19:40:06.553035719	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 19:40:06.554043532	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 19:40:08.677328824	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 19:40:08.678744345	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 19:40:10.160612614	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 19:40:10.166538398	192.168.1.50	155.207.18.208	UDP	55	48048 → 38048 Len=13
10	2020-11-23 19:40:10.545951887	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
11	2020-11-23 19:40:10.583952179	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
12	2020-11-23 19:40:10.621947221	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
13	2020-11-23 19:40:10.659929802	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
14	2020-11-23 19:40:10.698502992	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
15	2020-11-23 19:40:10.736149860	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
16	2020-11-23 19:40:10.774405672	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
17	2020-11-23 19:40:10.812627546	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
18	2020-11-23 19:40:10.850626737	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
19	2020-11-23 19:40:10.888953357	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
20	2020-11-23 19:40:10.926627034	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
21	2020-11-23 19:40:10.965135893	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
22	2020-11-23 19:40:11.003159788	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
23	2020-11-23 19:40:11.041135160	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
24	2020-11-23 19:40:11.079643172	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024

▶ Frame 9: 55 bytes on wire (440 bits), 55 bytes captured (440 bits) on interface enp2s0, id 0  
 ▶ Ethernet II, Src: HewlettP\_96:9d:b6 (40:b0:34:96:9d:b6), Dst: zte\_1a:b4:0a (d4:76:ea:1a:b4:0a)  
 ▶ Internet Protocol Version 4, Src: 192.168.1.50, Dst: 155.207.18.208  
 ▶ User Datagram Protocol, Src Port: 48048, Dst Port: 38048  
 ▼ Data (13 bytes)  
 Data: 4d373438355544503d31303234  
 [Length: 13]

```

0000  d4 76 ea 1a b4 0a 40 b0  34 96 9d b6 08 00 45 00  v---@ 4---E-
0010  00 29 03 41 40 00 40 11  c7 09 c0 a8 01 32 9b cf  > A@ @ ---2-
0020  12 d0 bb b0 94 a0 00 15  a2 80 4d 37 34 38 35 55  -----M7485U
0030  44 50 3d 31 30 32 34  DP=1024
  
```

Figure 3: Image request code

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 19:40:03.768368594	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 19:40:05.420911957	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 19:40:05.448599969	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 19:40:06.553035719	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 19:40:06.554043532	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 19:40:08.677328824	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 19:40:08.678744345	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 19:40:10.160612614	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 19:40:10.166538398	192.168.1.50	155.207.18.208	UDP	55	48048 → 38048 Len=13
10	2020-11-23 19:40:10.545951887	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
11	2020-11-23 19:40:10.583952179	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
12	2020-11-23 19:40:10.621947221	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
13	2020-11-23 19:40:10.659929802	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
14	2020-11-23 19:40:10.698502992	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
15	2020-11-23 19:40:10.736149860	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
16	2020-11-23 19:40:10.774405672	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
17	2020-11-23 19:40:10.812627546	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
18	2020-11-23 19:40:10.850626737	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
19	2020-11-23 19:40:10.888953357	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
20	2020-11-23 19:40:10.926627034	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
21	2020-11-23 19:40:10.965135893	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
22	2020-11-23 19:40:11.003159788	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
23	2020-11-23 19:40:11.041135160	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
24	2020-11-23 19:40:11.079643172	155.207.18.208	192.168.1.50	UDP	1066	58048 → 48048 Len=1024
▶ Frame 10: 1066 bytes on wire (8528 bits), 1066 bytes captured (8528 bits) on interface enp2s0, id 0 ▶ Ethernet II, Src: zte_1a:b4:0a (d4:76:ea:1a:b4:0a), Dst: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6) ▶ Internet Protocol Version 4, Src: 155.207.18.208, Dst: 192.168.1.50 ▶ User Datagram Protocol, Src Port: 58048, Dst Port: 48048 ▼ Data (1024 bytes) Data: ffd8ffef000104a46494600010200000100010000ffdb0043000806060706050807070709... [Length: 1024]						
0020	01 32 e2 c0 bb b0 04 08 e1 95 ff d8 ff e0 00 10	-2-.....-.....				
0030	4a 46 49 46 00 01 02 00 00 01 00 01 00 00 ff db	JFIF.....				
0040	00 43 00 08 06 06 07 06 05 08 07 07 09 09 08	C.....				
0050	0a 0c 14 0d 0c 0b 0b 0c 19 12 13 0f 14 1a 1f	.....				

Figure 4: Image response data

## 2 Audio

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:08:46.376918801	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:08:47.578418294	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:08:47.607870575	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:08:49.185488129	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:08:49.186724649	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:08:51.477643746	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:08:51.479524734	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:08:52.672395521	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:08:52.724512185	192.168.1.50	155.207.18.208	UDP	56	48048 → 38048 Len=14
10	2020-11-23 20:08:52.756087030	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
11	2020-11-23 20:08:52.784143631	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
12	2020-11-23 20:08:52.812950245	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
13	2020-11-23 20:08:52.842156930	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
14	2020-11-23 20:08:52.871130762	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
15	2020-11-23 20:08:52.900334153	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
16	2020-11-23 20:08:52.929329754	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
17	2020-11-23 20:08:52.958593145	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
18	2020-11-23 20:08:52.987145841	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
19	2020-11-23 20:08:53.016102052	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
20	2020-11-23 20:08:53.045384385	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
21	2020-11-23 20:08:53.073955482	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
22	2020-11-23 20:08:53.103137360	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
23	2020-11-23 20:08:53.132135200	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
24	2020-11-23 20:08:53.160933014	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
▶ Frame 7: 47 bytes on wire (376 bits), 47 bytes captured (376 bits) on interface enp2s0, id 0 ▶ Ethernet II, Src: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6), Dst: zte_1a:b4:0a (d4:76:ea:1a:b4:0a) ▶ Internet Protocol Version 4, Src: 192.168.1.50, Dst: 155.207.18.208 ▶ User Datagram Protocol, Src Port: 48048, Dst Port: 38048 ▼ Data (5 bytes) Data: 4533343538 [Length: 5]						
0000	d4 76 ea 1a b4 0a 00 b0 34 96 9d b6 08 00 45 00	v.....@ 4.....E				
0010	00 21 a6 e0 40 00 40 11 23 72 c0 a8 01 32 9b cf	I...@.#r...2..				
0020	12 d0 bb b0 94 a0 00 0d 8d a0 45 33 34 35 38	.....E3458				

Figure 5: Echo request code

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:08:46.376918801	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:08:47.578418294	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:08:47.607870575	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:08:49.185488129	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:08:49.186724649	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:08:51.477643746	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:08:51.479524734	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:08:52.672395521	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:08:52.724512185	192.168.1.50	155.207.18.208	UDP	56	48048 → 38048 Len=14
10	2020-11-23 20:08:52.756087030	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
11	2020-11-23 20:08:52.784143631	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
12	2020-11-23 20:08:52.812950245	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
13	2020-11-23 20:08:52.842156930	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
14	2020-11-23 20:08:52.871130762	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
15	2020-11-23 20:08:52.900334153	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
16	2020-11-23 20:08:52.929329754	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
17	2020-11-23 20:08:52.958593145	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
18	2020-11-23 20:08:52.987145841	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
19	2020-11-23 20:08:53.016102052	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
20	2020-11-23 20:08:53.045384385	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
21	2020-11-23 20:08:53.073955482	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
22	2020-11-23 20:08:53.103137360	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
23	2020-11-23 20:08:53.132135200	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
24	2020-11-23 20:08:53.160933014	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132

▶ Frame 8: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface enp2s0, id 0  
 ▶ Ethernet II, Src: zte\_1a:b4:0a (d4:76:ea:1a:b4:0a), Dst: HewlettP\_96:9d:b6 (40:b0:34:96:9d:b6)  
 ▶ Internet Protocol Version 4, Src: 155.207.18.208, Dst: 192.168.1.50  
 ▶ User Datagram Protocol, Src Port: 58048, Dst Port: 48048  
 ▼ Data (32 bytes)  
 Data: 5053544152542032332d31312d323032302032303a30383a3533205053544f50  
 [Length: 32]

0000	40 b0 34 96 9d b6 d4 76	ea 1a b4 0a 08 00 45 00	@ 4 ---v -----E
0010	00 3c c1 4f 00 00 79 11	0f e8 9b cf 12 d0 c0 a8	< 0 --y -----
0020	01 32 e2 c0 bb b0 00 28	4a f2 50 53 54 41 52 54	2----- ( J PSTART
0030	20 32 33 2d 31 31 2d 32	30 32 30 20 32 30 3a 30	23-11-2 020 20:0
0040	38 3a 35 33 20 50 53 54	4f 50	8:53 PST OP

Figure 6: Echo response time

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:08:46.376918801	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:08:47.578418294	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:08:47.607870575	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:08:49.185488129	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:08:49.186724649	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:08:51.477643746	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:08:51.479524734	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:08:52.672395521	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:08:52.724512185	192.168.1.50	155.207.18.208	UDP	56	48048 → 38048 Len=14
10	2020-11-23 20:08:52.756087030	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
11	2020-11-23 20:08:52.784143631	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
12	2020-11-23 20:08:52.812950245	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
13	2020-11-23 20:08:52.842156930	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
14	2020-11-23 20:08:52.871130762	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
15	2020-11-23 20:08:52.900334153	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
16	2020-11-23 20:08:52.929329754	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
17	2020-11-23 20:08:52.958593145	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
18	2020-11-23 20:08:52.987145841	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
19	2020-11-23 20:08:53.016102052	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
20	2020-11-23 20:08:53.045384385	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
21	2020-11-23 20:08:53.073955482	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
22	2020-11-23 20:08:53.103137360	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
23	2020-11-23 20:08:53.132135200	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
24	2020-11-23 20:08:53.160933014	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132

▶ Frame 9: 56 bytes on wire (448 bits), 56 bytes captured (448 bits) on interface enp2s0, id 0  
 ▶ Ethernet II, Src: HewlettP\_96:9d:b6 (40:b0:34:96:9d:b6), Dst: zte\_1a:b4:0a (d4:76:ea:1a:b4:0a)  
 ▶ Internet Protocol Version 4, Src: 192.168.1.50, Dst: 155.207.18.208  
 ▶ User Datagram Protocol, Src Port: 48048, Dst Port: 38048  
 ▼ Data (14 bytes)  
 Data: 4c32324131313832415146353030  
 [Length: 14]

0000	d4 76 ea 1a b4 0a 40 b0	34 96 9d b6 08 00 45 00	v---@ 4-----E
0010	00 2a a8 43 40 00 40 11	22 06 c0 a8 01 32 9b cf	*C@- "----2--
0020	12 d0 bb b0 94 a0 00 16	9f 69 4c 32 32 41 31 31	----- iL22A11
0030	38 32 41 51 46 35 30 30		82AQF500

Figure 7: Audio request code



No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:08:46.376918801	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:08:47.578418294	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:08:47.607870575	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:08:49.185488129	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:08:49.186724649	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:08:51.477643746	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:08:51.479524734	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:08:52.672395521	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:08:52.724512185	192.168.1.50	155.207.18.208	UDP	56	48048 → 38048 Len=14
10	2020-11-23 20:08:52.756087030	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
11	2020-11-23 20:08:52.784143631	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
12	2020-11-23 20:08:52.812950245	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
13	2020-11-23 20:08:52.842156930	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
14	2020-11-23 20:08:52.871130762	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
15	2020-11-23 20:08:52.900334153	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
16	2020-11-23 20:08:52.929329754	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
17	2020-11-23 20:08:52.958593145	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
18	2020-11-23 20:08:52.987145841	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
19	2020-11-23 20:08:53.016102052	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
20	2020-11-23 20:08:53.045384385	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
21	2020-11-23 20:08:53.073955482	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
22	2020-11-23 20:08:53.103137360	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
23	2020-11-23 20:08:53.132135200	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
24	2020-11-23 20:08:53.160933014	155.207.18.208	192.168.1.50	UDP	174	58048 → 48048 Len=132
▶ Frame 10: 174 bytes on wire (1392 bits), 174 bytes captured (1392 bits) on interface enp2s0, id 0 ▶ Ethernet II, Src: zte_1a:b4:0a (d4:76:ea:1a:b4:0a), Dst: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6) ▶ Internet Protocol Version 4, Src: 155.207.18.208, Dst: 192.168.1.50 ▶ User Datagram Protocol, Src Port: 58048, Dst Port: 48048 ▶ Data (132 bytes) Data: d6ffa502ffb39a47ab8439c86c709ba903a9aab86bb66c836ffba866bd76ac23dca24b5... [Length: 132]						
0000 40 b0 34 96 9d b6 d4 76 ea 1a b4 0a 08 00 45 00 @ 4 ---v ---E 0010 00 a0 c1 50 00 00 79 11 0f 83 9b cf 12 d0 c0 a8 ---P---y----- 0020 01 32 e2 c0 bb b0 00 8c 04 14 36 ff a5 02 ff b3 -2-----f----- 0030 9a 47 ab 84 39 c8 6c 70 9b a9 03 a9 aa b8 6b bb -G-91p---k--- 0040 66 c8 36 ff ba 86 6b d7 6a c2 3d ca 24 b5 77 77 f 6---k-j---\$ww 0050 49 fa 25 b9 14 fc 39 d7 34 7c a7 a8 1a bb 61 bb 1%-9-4j---a- 0060 57 b6 88 6c 85 a8 99 87 7a 8a 55 66 98 ac 45 9b w-1---z-Uf-E- 0070 97 33 87 b9 58 b7 9b 8a 87 8d 95 ca b5 9f 76 bb -3-X-----v- 0080 a9 a7 88 7a 54 98 a5 89 79 27 83 8a a6 7b 37 b9 ---zT---y'---{7- 0090 58 bb b4 67 79 48 d4 69 a7 66 9a 7e 75 7a 85 9b X-gyH-i-f-uz- 00a0 a7 44 d8 85 6c 78 76 87 95 8b 88 0b 84 87 -D-1xv-----						

Figure 8: Audio response data

### 3 Ithakicopter TCP version

Αξίζει να σημειωθεί ότι στο input stream , τη στιγμή δημιουργίας TCP socket, δέχομαστε δεδομένα (οδηγίες χρήσης σχετικά με το format του μηνύματος αποστολής για να ληφθούν δεδομένα), προτού γράψουμε κάτι στο output stream. Ενδεικτικά δείχνουμε στο capture (Figure 12) την ωφέλιμη πληροφορία.

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:24:42.986922044	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:24:45.307284165	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:24:45.316205429	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:24:46.741049639	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:24:46.742205473	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:24:48.582255247	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:24:48.583551665	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:24:51.096524013	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:24:51.123867340	192.168.1.50	155.207.18.208	TCP	74	46056 → 38048 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316211117 TSecr=0 WS=128
10	2020-11-23 20:24:51.155017954	155.207.18.208	192.168.1.50	TCP	66	38048 → 46056 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
11	2020-11-23 20:24:51.155144976	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=1 Ack=1 Win=64256 Len=0
12	2020-11-23 20:24:51.184728500	192.168.1.50	155.207.18.208	TCP	105	46056 → 38048 [PSH, ACK] Seq=1 Ack=1 Win=262656 Len=51
13	2020-11-23 20:24:51.186344394	155.207.18.208	192.168.1.50	TCP	71	38048 → 46056 [PSH, ACK] Seq=1 Ack=1 Win=262656 Len=17 [TCP segment of a reassembled PDU]
14	2020-11-23 20:24:51.186390995	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=18 Win=64256 Len=0
15	2020-11-23 20:24:51.215738078	155.207.18.208	192.168.1.50	TCP	466	38048 → 46056 [PSH, ACK] Seq=18 Ack=52 Win=262656 Len=412 [TCP segment of a reassembled PDU]
16	2020-11-23 20:24:51.215769448	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=430 Win=64128 Len=0
17	2020-11-23 20:24:51.246017011	155.207.18.208	192.168.1.50	TCP	150	38048 → 46056 [PSH, ACK] Seq=430 Ack=52 Win=262656 Len=96
18	2020-11-23 20:24:51.246052667	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=526 Win=64128 Len=0
19	2020-11-23 20:24:51.247750418	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [FIN, ACK] Seq=52 Ack=526 Win=64128 Len=0
20	2020-11-23 20:24:51.248289199	192.168.1.50	155.207.18.208	TCP	74	46058 → 38048 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316211241 TSecr=0 WS=128
21	2020-11-23 20:24:51.278995918	155.207.18.208	192.168.1.50	TCP	60	38048 → 46056 [ACK] Seq=526 Ack=53 Win=262656 Len=0
22	2020-11-23 20:24:51.279626702	155.207.18.208	192.168.1.50	TCP	66	38048 → 46056 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
23	2020-11-23 20:24:51.279761414	192.168.1.50	155.207.18.208	TCP	54	46058 → 38048 [ACK] Seq=1 Ack=1 Win=64256 Len=0
24	2020-11-23 20:24:51.280394884	192.168.1.50	155.207.18.208	TCP	105	46058 → 38048 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=51
▶ Frame 7: 47 bytes on wire (376 bits), 47 bytes captured (376 bits) on interface enp2s0, id 0 ▶ Ethernet II, Src: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6), Dst: zte_1a:b4:0a (d4:76:ea:1a:b4:0a) ▶ Internet Protocol Version 4, Src: 192.168.1.50, Dst: 155.207.18.208 ▶ User Datagram Protocol, Src Port: 48048, Dst Port: 38048 ▶ Data (5 bytes) Data: 4533243538 [Length: 5]						
0000 d4 76 ea 1a b4 0a 40 b0 34 96 9d b6 08 00 45 00 -v---@- 4-----E 0010 00 21 a5 2d 40 00 40 11 25 25 c0 a8 01 32 9b cf -1--@-@-%%---2-- 0020 12 d0 bb b0 94 a0 00 0d 8d a0 45 33 34 35 38 -----3458						

Figure 9: Echo request code

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:24:42.986922044	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:24:45.307284165	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:24:45.316205429	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:24:46.741049639	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:24:46.742205473	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:24:48.582255247	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:24:48.583551665	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:24:51.096524013	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:24:51.123867340	192.168.1.50	155.207.18.208	TCP	74	46056 → 38048 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316211117 TSecr=0 WS=128
10	2020-11-23 20:24:51.155017954	155.207.18.208	192.168.1.50	TCP	66	38048 → 46056 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
11	2020-11-23 20:24:51.155144976	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=1 Ack=1 Win=64256 Len=0
12	2020-11-23 20:24:51.184728500	192.168.1.50	155.207.18.208	TCP	105	46056 → 38048 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=51
13	2020-11-23 20:24:51.186344394	155.207.18.208	192.168.1.50	TCP	71	38048 → 46056 [PSH, ACK] Seq=1 Ack=1 Win=262656 Len=17 [TCP segment of a reassembled PDU]
14	2020-11-23 20:24:51.186390995	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=18 Win=64256 Len=0
15	2020-11-23 20:24:51.215738078	155.207.18.208	192.168.1.50	TCP	466	38048 → 46056 [PSH, ACK] Seq=18 Ack=52 Win=262656 Len=412 [TCP segment of a reassembled PDU]
16	2020-11-23 20:24:51.215769448	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=430 Win=64128 Len=0
17	2020-11-23 20:24:51.246017011	155.207.18.208	192.168.1.50	TCP	150	38048 → 46056 [PSH, ACK] Seq=430 Ack=52 Win=262656 Len=96
18	2020-11-23 20:24:51.246052667	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=526 Win=64128 Len=0
19	2020-11-23 20:24:51.247750418	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [FIN, ACK] Seq=52 Ack=526 Win=64128 Len=0
20	2020-11-23 20:24:51.248289199	192.168.1.50	155.207.18.208	TCP	74	46058 → 38048 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316211241 TSecr=0 WS=128
21	2020-11-23 20:24:51.278995918	155.207.18.208	192.168.1.50	TCP	60	38048 → 46056 [ACK] Seq=526 Ack=53 Win=262656 Len=0
22	2020-11-23 20:24:51.279626702	155.207.18.208	192.168.1.50	TCP	66	38048 → 46058 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
23	2020-11-23 20:24:51.279761414	192.168.1.50	155.207.18.208	TCP	54	46058 → 38048 [ACK] Seq=1 Ack=1 Win=64256 Len=0
24	2020-11-23 20:24:51.280394884	192.168.1.50	155.207.18.208	TCP	105	46058 → 38048 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=51
▶ Frame 8: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface enp2s0, id 0 ▶ Ethernet II, Src: zte_1a:b4:0a (d4:76:ea:1a:b4:0a), Dst: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6) ▶ Internet Protocol Version 4, Src: 155.207.18.208, Dst: 192.168.1.50 ▶ User Datagram Protocol, Src Port: 58048, Dst Port: 48048 ▼ Data (32 bytes) Data: 6053544152542032332d31312d323032302032303a32343a3532205053544f50 [Length: 32]						
0000	40 b0 34 96 9d b6 d4 76	ea 1a b4 0a 08 00 45 00	@ 4 . . . . v . . . . . E .			
0010	00 3c 6a 00 00 79 11 0d	cd 9b cf 12 00 c0 a8	< j . y . . . . .			
0020	01 32 c2 00 b0 b0 00 20	4e f1 50 53 54 41 52 50	2 . . . . ( N . P . S . T . A . R . T .			
0030	20 32 32 2d 31 31 2d 32	30 32 30 32 30 3a 32	23 - 11 - 2 0 20 20 : 2			
0040	34 3a 35 32 20 50 53 54	4f 50	4 : 52 . P . S . T . O . P .			

Figure 10: Echo response time

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:24:42.986922044	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:24:45.307284165	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:24:45.316205429	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:24:46.741049639	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:24:46.742205473	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:24:48.582255247	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:24:48.583551665	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:24:51.096524013	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:24:51.123867340	192.168.1.50	155.207.18.208	TCP	74	46056 → 38048 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316211117 TSecr=0 WS=128
10	2020-11-23 20:24:51.155017954	155.207.18.208	192.168.1.50	TCP	66	38048 → 46056 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
11	2020-11-23 20:24:51.155144976	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=1 Ack=1 Win=64256 Len=0
12	2020-11-23 20:24:51.184728500	192.168.1.50	155.207.18.208	TCP	105	46056 → 38048 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=51
13	2020-11-23 20:24:51.186344394	155.207.18.208	192.168.1.50	TCP	71	38048 → 46056 [PSH, ACK] Seq=1 Ack=1 Win=262656 Len=17 [TCP segment of a reassembled PDU]
14	2020-11-23 20:24:51.186390995	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=18 Win=64256 Len=0
15	2020-11-23 20:24:51.215738078	155.207.18.208	192.168.1.50	TCP	466	38048 → 46056 [PSH, ACK] Seq=18 Ack=52 Win=262656 Len=412 [TCP segment of a reassembled PDU]
16	2020-11-23 20:24:51.215769448	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=430 Win=64128 Len=0
17	2020-11-23 20:24:51.246017011	155.207.18.208	192.168.1.50	TCP	150	38048 → 46056 [PSH, ACK] Seq=430 Ack=52 Win=262656 Len=96
18	2020-11-23 20:24:51.246052667	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=526 Win=64128 Len=0
19	2020-11-23 20:24:51.247750418	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [FIN, ACK] Seq=52 Ack=526 Win=64128 Len=0
20	2020-11-23 20:24:51.248289199	192.168.1.50	155.207.18.208	TCP	74	46058 → 38048 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316211241 TSecr=0 WS=128
21	2020-11-23 20:24:51.278995918	155.207.18.208	192.168.1.50	TCP	60	38048 → 46056 [ACK] Seq=526 Ack=53 Win=262656 Len=0
22	2020-11-23 20:24:51.279626702	155.207.18.208	192.168.1.50	TCP	66	38048 → 46058 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
23	2020-11-23 20:24:51.279761414	192.168.1.50	155.207.18.208	TCP	54	46058 → 38048 [ACK] Seq=1 Ack=1 Win=64256 Len=0
24	2020-11-23 20:24:51.280394884	192.168.1.50	155.207.18.208	TCP	105	46058 → 38048 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=51
▶ Frame 12: 105 bytes on wire (840 bits), 105 bytes captured (840 bits) on interface enp2s0, id 0 ▶ Ethernet II, Src: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6), Dst: zte_1a:b4:0a (d4:76:ea:1a:b4:0a) ▶ Internet Protocol Version 4, Src: 192.168.1.50, Dst: 155.207.18.208 ▶ Transmission Control Protocol, Src Port: 46056, Dst Port: 38048, Seq: 1, Ack: 1, Len: 51 ▼ Data (51 bytes) Data: 4155544f20464c494748544c4556454c3d313830204c4d4f544f523d31383020524d4f54 [Length: 51]						
0000	d4 76 ea 1a b4 0a 40 b0	34 96 9d b6 08 00 45 00	v . . . . @ 4 . . . . . E .			
0010	00 5b 24 26 40 00 40 06	a5 fd c0 a8 01 32 9b cf	[ \$ @ @ . . . . . 2 .			
0020	12 d0 b3 e8 94 a0 fb db	72 6d b7 4e ba 9c 50 18	. . . . . r m . N . P .			
0030	01 f6 70 c7 00 00 01 55	54 4f 20 45 4c 49 47 48	. . . . . p . . . . . A U . T . F . L . I . G . H .			
0040	54 4c 45 56 45 4c 3d 31	38 30 20 4c 4d 4f 54 4f	T . L . E . V . E . L . = 1 80 L . M . O . T . O .			
0050	52 3d 31 38 30 20 52 4d	4f 54 4f 52 3d 31 38 30	R = 180 R . M . O . T . O . R = 180			
0060	20 50 49 4c 4f 54 20 0d	0a	P . I . L . O . T . . . . .			

Figure 11: Copter output stream

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:24:42.986922844	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:24:45.307284165	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:24:45.316205429	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:24:46.741049639	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:24:46.742205473	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:24:48.582255247	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:24:48.583551665	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:24:51.096524013	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:24:51.123867340	192.168.1.50	155.207.18.208	TCP	74	46056 → 38048 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316211117 TSecr=0 WS=128
10	2020-11-23 20:24:51.155017954	155.207.18.208	192.168.1.50	TCP	66	38048 → 46056 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
11	2020-11-23 20:24:51.155144976	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=1 Ack=1 Win=64256 Len=0
12	2020-11-23 20:24:51.184728500	192.168.1.50	155.207.18.208	TCP	105	46056 → 38048 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=51
13	2020-11-23 20:24:51.186344394	155.207.18.208	192.168.1.50	TCP	71	38048 → 46056 [PSH, ACK] Seq=1 Ack=1 Win=262656 Len=17 [TCP segment of a reassembled PDU]
14	2020-11-23 20:24:51.186390995	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=18 Win=64256 Len=0
15	2020-11-23 20:24:51.215738078	155.207.18.208	192.168.1.50	TCP	466	38048 → 46056 [PSH, ACK] Seq=18 Ack=52 Win=262656 Len=412 [TCP segment of a reassembled PDU]
16	2020-11-23 20:24:51.215769448	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=430 Win=64128 Len=0
17	2020-11-23 20:24:51.246017011	155.207.18.208	192.168.1.50	TCP	150	38048 → 46056 [PSH, ACK] Seq=430 Ack=52 Win=262656 Len=96
18	2020-11-23 20:24:51.246052667	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [ACK] Seq=52 Ack=526 Win=64128 Len=0
19	2020-11-23 20:24:51.247750418	192.168.1.50	155.207.18.208	TCP	54	46056 → 38048 [FIN, ACK] Seq=52 Ack=526 Win=64128 Len=0
20	2020-11-23 20:24:51.248289199	192.168.1.50	155.207.18.208	TCP	74	46058 → 38048 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316211241 TSecr=0 WS=128
21	2020-11-23 20:24:51.278995918	155.207.18.208	192.168.1.50	TCP	60	38048 → 46056 [ACK] Seq=526 Ack=53 Win=262656 Len=0
22	2020-11-23 20:24:51.279676702	155.207.18.208	192.168.1.50	TCP	66	38048 → 46056 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
23	2020-11-23 20:24:51.279761414	192.168.1.50	155.207.18.208	TCP	54	46058 → 38048 [ACK] Seq=1 Ack=1 Win=64256 Len=0
24	2020-11-23 20:24:51.280394884	192.168.1.50	155.207.18.208	TCP	105	46058 → 38048 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=51

▶ Frame 17: 150 bytes on wire (1200 bits), 150 bytes captured (1200 bits) on interface enp2s0, id 0  
 ▶ Ethernet II, Src: zte\_la:b4:0a (d4:76:ea:1a:b4:0a), Dst: HewlettP.96:9d:b6 (40:b0:34:96:9d:b6)  
 ▶ Internet Protocol Version 4, Src: 155.207.18.208, Dst: 192.168.1.50  
 ▶ Transmission Control Protocol, Src Port: 38048, Dst Port: 46056, Seq: 430, Ack: 52, Len: 96

0000	40 b0 34 96 9d b6 d4 76 ea 1a b4 0a 00 00 45 00	@ 4 --- v --- E
0010	00 88 c3 6e 40 00 79 06 cd 87 9b cf 12 d0 c0 a8	--- n e y ---
0020	01 32 94 a0 b3 e8 b7 4e bc 49 fb db 72 a0 50 18	- 2 --- N I - r P
0030	04 02 ad 0c 00 00 89 54 48 41 4b 49 43 4f 50 54	--- ITT HAKICOPT
0040	45 52 20 4c 4d 4f 54 4f 52 30 30 30 20 52 46	E- LKOTO R=000 RM
0050	4f 54 4f 52 30 30 20 20 41 4c 54 49 54 55 44	OTOR=000 ALTITUDE
0060	45 3d 30 37 37 20 54 45 4d 50 45 52 41 54 55 52	E=077 TE MPERATUR
0070	45 3d 2b 32 33 2e 37 30 20 50 52 45 53 53 55 52	E=+23.70 PRESSURE
0080	45 3d 31 30 31 37 2e 39 31 20 54 45 4c 45 4d 45	E=1017.9 1 TELEME
0090	54 52 59 20 0d 05	TRY --

Figure 12: Copter input stream

## 4 Car fault diagnostics

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:36:14.026147421	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:36:15.557369520	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:36:15.583733587	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:36:16.723324424	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:36:16.724686666	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:36:18.183833504	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:36:18.184863628	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:36:18.966127374	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:36:18.995315523	192.168.1.50	155.207.18.208	TCP	74	40392 → 29078 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316898988 TSecr=0 WS=128
10	2020-11-23 20:36:19.026996147	155.207.18.208	192.168.1.50	TCP	66	29078 → 40392 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
11	2020-11-23 20:36:19.027051541	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=1 Ack=1 Win=64256 Len=0
12	2020-11-23 20:36:19.030399087	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=6
13	2020-11-23 20:36:19.066654417	155.207.18.208	192.168.1.50	TCP	66	29078 → 40392 [PSH, ACK] Seq=1 Ack=7 Win=262656 Len=12
14	2020-11-23 20:36:19.066703143	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=7 Ack=13 Win=64256 Len=0
15	2020-11-23 20:36:19.092167027	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=7 Ack=13 Win=64256 Len=6
16	2020-11-23 20:36:19.166295143	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=13 Ack=13 Win=262656 Len=0
17	2020-11-23 20:36:19.170267303	155.207.18.208	192.168.1.50	TCP	63	29078 → 40392 [PSH, ACK] Seq=13 Ack=13 Win=262656 Len=9
18	2020-11-23 20:36:19.170293557	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=13 Ack=22 Win=64256 Len=0
19	2020-11-23 20:36:19.171614106	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=13 Ack=22 Win=64256 Len=6
20	2020-11-23 20:36:19.244021349	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=22 Ack=19 Win=262656 Len=0
21	2020-11-23 20:36:19.280578992	155.207.18.208	192.168.1.50	TCP	63	29078 → 40392 [PSH, ACK] Seq=22 Ack=19 Win=262656 Len=9
22	2020-11-23 20:36:19.280609942	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=19 Ack=31 Win=64256 Len=0
23	2020-11-23 20:36:19.28040317	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=19 Ack=31 Win=64256 Len=6
24	2020-11-23 20:36:19.353341664	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=31 Ack=25 Win=262656 Len=0

▶ Frame 7: 47 bytes on wire (376 bits), 47 bytes captured (376 bits) on interface enp2s0, id 0  
 ▶ Ethernet II, Src: HewlettP.96:9d:b6 (40:b0:34:96:9d:b6), Dst: zte\_la:b4:0a (d4:76:ea:1a:b4:0a)  
 ▶ Internet Protocol Version 4, Src: 192.168.1.50, Dst: 155.207.18.208  
 ▶ User Datagram Protocol, Src Port: 48048, Dst Port: 38048  
 ▶ Data (5 bytes)  
 Data: 4533343538  
 [Length: 5]

0000	d4 76 ea 1a b4 0a 00 b0 34 96 9d b6 00 00 45 00	v --- @ 4 --- E
0010	00 21 08 e0 40 00 40 11 c1 72 c0 a8 01 32 9b cf	! - @ - @ - r - 2 -
0020	12 d0 bb b0 94 a0 00 bd 8d a0 45 33 34 35 36	----- 53456

Figure 13: Echo request code



No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:36:14.026147421	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:36:15.557369520	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:36:15.583733587	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:36:16.723324424	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:36:16.724686666	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:36:18.183833504	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:36:18.184863628	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:36:18.966127374	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:36:18.995315523	192.168.1.50	155.207.18.208	TCP	74	40392 → 29078 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316898988 TSecr=0 WS=128
10	2020-11-23 20:36:19.026996147	155.207.18.208	192.168.1.50	TCP	66	29078 → 40392 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
11	2020-11-23 20:36:19.027051541	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=1 Ack=1 Win=64256 Len=0
12	2020-11-23 20:36:19.030399087	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=6
13	2020-11-23 20:36:19.066654417	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [PSH, ACK] Seq=1 Ack=7 Win=262656 Len=12
14	2020-11-23 20:36:19.066703143	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=7 Ack=13 Win=64256 Len=0
15	2020-11-23 20:36:19.092167027	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=7 Ack=13 Win=64256 Len=6
16	2020-11-23 20:36:19.166295143	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=13 Ack=13 Win=262656 Len=0
17	2020-11-23 20:36:19.170267303	155.207.18.208	192.168.1.50	TCP	63	29078 → 40392 [PSH, ACK] Seq=13 Ack=13 Win=262656 Len=9
18	2020-11-23 20:36:19.170293557	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=13 Ack=22 Win=64256 Len=0
19	2020-11-23 20:36:19.171614186	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=13 Ack=22 Win=64256 Len=6
20	2020-11-23 20:36:19.244821349	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=22 Ack=19 Win=262656 Len=0
21	2020-11-23 20:36:19.280578992	155.207.18.208	192.168.1.50	TCP	63	29078 → 40392 [PSH, ACK] Seq=22 Ack=19 Win=262656 Len=9
22	2020-11-23 20:36:19.280609942	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=19 Ack=31 Win=64256 Len=0
23	2020-11-23 20:36:19.282040317	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=19 Ack=31 Win=64256 Len=6
24	2020-11-23 20:36:19.353341664	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=31 Ack=25 Win=262656 Len=0
▶ Frame 8: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface enp2s0, id 0 ▶ Ethernet II, Src: zte_1a:b4:0a (d4:76:ea:1a:b4:0a), Dst: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6) ▶ Internet Protocol Version 4, Src: 155.207.18.208, Dst: 192.168.1.50 ▶ User Datagram Protocol, Src Port: 58048, Dst Port: 48048 ▼ Data (32 bytes) Data: 6053544152542032332d31312d323032302032303a33363a3139205053544f50 [Length: 32]						
0000	40 b0 34 96 9d b6 d4 76 ea 1a b4 0a 08 00 45 00	@ 4...v...E				
0010	00 3c c4 16 00 00 79 11 0d 21 9b cf 12 00 c0 a8	-<...y...l...				
0020	01 32 c2 c0 b0 b0 00 28 50 c9 50 53 54 41 52 30	2...C...P...START				
0030	20 32 33 2d 31 31 2d 32 30 32 30 20 32 30 3a 33	23-11-2 020 20:3				
0040	36 3a 31 39 20 50 53 54 4f 50	6-19 PST 0F				

Figure 14: Echo response time

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:36:14.026147421	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:36:15.557369520	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:36:15.583733587	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:36:16.723324424	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:36:16.724686666	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:36:18.183833504	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:36:18.184863628	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:36:18.966127374	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:36:18.995315523	192.168.1.50	155.207.18.208	TCP	74	40392 → 29078 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316898988 TSecr=0 WS=128
10	2020-11-23 20:36:19.026996147	155.207.18.208	192.168.1.50	TCP	66	29078 → 40392 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
11	2020-11-23 20:36:19.027051541	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=1 Ack=1 Win=64256 Len=0
12	2020-11-23 20:36:19.030399087	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=6
13	2020-11-23 20:36:19.066654417	155.207.18.208	192.168.1.50	TCP	66	29078 → 40392 [PSH, ACK] Seq=1 Ack=7 Win=262656 Len=12
14	2020-11-23 20:36:19.066703143	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=7 Ack=13 Win=64256 Len=0
15	2020-11-23 20:36:19.092167027	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=7 Ack=13 Win=64256 Len=6
16	2020-11-23 20:36:19.166295143	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=13 Ack=13 Win=262656 Len=0
17	2020-11-23 20:36:19.170267303	155.207.18.208	192.168.1.50	TCP	63	29078 → 40392 [PSH, ACK] Seq=13 Ack=13 Win=262656 Len=9
18	2020-11-23 20:36:19.170293557	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=13 Ack=22 Win=64256 Len=0
19	2020-11-23 20:36:19.171614186	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=13 Ack=22 Win=64256 Len=6
20	2020-11-23 20:36:19.244821349	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=22 Ack=19 Win=262656 Len=0
21	2020-11-23 20:36:19.280578992	155.207.18.208	192.168.1.50	TCP	63	29078 → 40392 [PSH, ACK] Seq=22 Ack=19 Win=262656 Len=9
22	2020-11-23 20:36:19.280609942	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=19 Ack=31 Win=64256 Len=0
23	2020-11-23 20:36:19.282040317	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=19 Ack=31 Win=64256 Len=6
24	2020-11-23 20:36:19.353341664	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=31 Ack=25 Win=262656 Len=0
▶ Frame 12: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface enp2s0, id 0 ▶ Ethernet II, Src: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6), Dst: zte_1a:b4:0a (d4:76:ea:1a:b4:0a) ▶ Internet Protocol Version 4, Src: 192.168.1.50, Dst: 155.207.18.208 ▶ Transmission Control Protocol, Src Port: 40392, Dst Port: 29078, Seq: 1, Ack: 1, Len: 6 ▼ Data (6 bytes) Data: 30312031460d [Length: 6]						
0000	d4 76 ea 1a b4 0a 40 b0 34 96 9d b6 08 00 45 00	v...@ 4...E				
0010	00 2e af 05 00 40 06 1a c0 c0 a8 01 32 9b cf	...@ @...2				
0020	12 d0 9d c8 71 96 14 cc c1 2d 8b 12 bf 3a 50 18	...q...P				
0030	01 f6 70 9a 00 00 80 31 20 31 46 0e	...p...01 1F				

Figure 15: Vehicle output stream

No.	Time	Source	Destination	Protocol	Length	Info
1	2020-11-23 20:36:14.026147421	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
2	2020-11-23 20:36:15.557369520	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
3	2020-11-23 20:36:15.583733587	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
4	2020-11-23 20:36:16.723324424	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
5	2020-11-23 20:36:16.724686666	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
6	2020-11-23 20:36:18.183833504	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
7	2020-11-23 20:36:18.184863628	192.168.1.50	155.207.18.208	UDP	47	48048 → 38048 Len=5
8	2020-11-23 20:36:18.966127374	155.207.18.208	192.168.1.50	UDP	74	58048 → 48048 Len=32
9	2020-11-23 20:36:18.995315523	192.168.1.50	155.207.18.208	TCP	74	40392 → 29078 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=316898988 TSecr=0 WS=128
10	2020-11-23 20:36:19.026996147	155.207.18.208	192.168.1.50	TCP	66	29078 → 40392 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1436 WS=256 SACK_PERM=1
11	2020-11-23 20:36:19.027051541	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=1 Ack=1 Win=64256 Len=0
12	2020-11-23 20:36:19.030399087	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=1 Ack=1 Win=64256 Len=6
13	2020-11-23 20:36:19.066654417	155.207.18.208	192.168.1.50	TCP	66	29078 → 40392 [PSH, ACK] Seq=1 Ack=7 Win=262656 Len=12
14	2020-11-23 20:36:19.066703143	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=7 Ack=13 Win=64256 Len=0
15	2020-11-23 20:36:19.092167027	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=7 Ack=13 Win=64256 Len=6
16	2020-11-23 20:36:19.166295143	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=13 Ack=13 Win=262656 Len=0
17	2020-11-23 20:36:19.170293557	155.207.18.208	192.168.1.50	TCP	63	29078 → 40392 [PSH, ACK] Seq=13 Ack=13 Win=262656 Len=9
18	2020-11-23 20:36:19.170293557	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=13 Ack=22 Win=64256 Len=0
19	2020-11-23 20:36:19.171614186	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=13 Ack=22 Win=64256 Len=6
20	2020-11-23 20:36:19.244821349	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=22 Ack=19 Win=262656 Len=0
21	2020-11-23 20:36:19.280578992	155.207.18.208	192.168.1.50	TCP	63	29078 → 40392 [PSH, ACK] Seq=22 Ack=19 Win=262656 Len=9
22	2020-11-23 20:36:19.280609942	192.168.1.50	155.207.18.208	TCP	54	40392 → 29078 [ACK] Seq=19 Ack=31 Win=64256 Len=0
23	2020-11-23 20:36:19.282040317	192.168.1.50	155.207.18.208	TCP	60	40392 → 29078 [PSH, ACK] Seq=19 Ack=31 Win=64256 Len=6
24	2020-11-23 20:36:19.353341664	155.207.18.208	192.168.1.50	TCP	60	29078 → 40392 [ACK] Seq=31 Ack=25 Win=262656 Len=0
▶ Frame 13: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface enp2s0, id 0 ▶ Ethernet II, Src: zte_1a:b4:0a (d4:76:ea:1a:b4:0a), Dst: HewlettP_96:9d:b6 (40:b0:34:96:9d:b6) ▶ Internet Protocol Version 4, Src: 155.207.18.208, Dst: 192.168.1.50 ▶ Transmission Control Protocol, Src Port: 29078, Dst Port: 40392, Seq: 1, Ack: 7, Len: 12 ▶ Data (12 bytes) Data: 34312031462030302030300d [Length: 12]						
0000	40 b0 34 96 9d b6 d4 76	ea 1a b4 0a 08 00 45 00	@ 4 . . . . v . . . . . E .			
0010	00 34 c4 18 40 00 79 06	cd 31 9b cf 12 d0 c0 a8	- 4 - @ - y - . 1 - . . . . .			
0020	01 32 71 96 9d c8 8b 12	bf 3a 14 cc c1 33 50 18	- 2 q - . . . . . : . . . . . 3 P .			
0030	04 02 f0 a8 00 00 34 31	20 31 46 20 30 30 20 30	- . . . . . 4 1 . f 0 0 0			
0040	00 00	00	0			

Figure 16: Vehicle input stream