

PPTT IDID IDID FFCC

Pressure in hex(One byte PP) to dec+60 = pressure in kPa

Temperature hex(One byte TT) to dec -50 = temp in C

ID in hex(2 Words = 4 bytes)

Flags (FF) = ???? ?SBT (Missing Acceleration, market - Europe/US/Asia, Tire type, Alert Mode, park mode, High Line vs Low Line etc)

S=Storage bit

B=Battery low bit

T=Triggered bit

C0 =1100 0000 = Battery OK, Not Triggered

C1 =1100 0001 = Battery OK, Triggered

C2 =1100 0010 = Battery Low, Not Triggered

C3 =1100 0011 = Battery Low, Triggered

C5 =1100 0101 = Battery OK, Triggered, Storage Mode

E1 =1110 0001 = Mx Sensor Clone for Elantra 2012 US market ? Low Line

C1 = Mx Sensor Clone for Genesis Sedan 2012 US market ? High Line

CC = CRC8

994A02226097C127

(99 4A 02 22 60 97 C1)CRC8 = 27

http://www.sunshine2k.de/coding/javascript/crc/crc_js.html

024C801A2D39C197

(024C801A2D39C1)CRC8 = 97

TMGG1TDDMN001 FCC id for gda tpms module

Part number G1TDDMN001 older GDS TPMS module.

Part number G0TKNMK001 GDS TPMS Module with bluetooth

www.myshared.ru/slide/885198

TRW TPMS sensor FCC id GQ4-44T

From FCC website

This transmitter is a transmitter device with tire valve, which is mounted in the valve hole of the wheel rim and transmits the pressure and temperature inside the tire, the battery voltage of the transmitter, and the tire identification code (ID) at normal condition with the radio wave (RF) that conforms to the used area. Also this device has a countermeasure function such as the random delay of transmission time so that the RF signal from each tire will not interfere due to the simultaneous transmission. The transmitter device also has a Low Frequency (LF) receiver. This receiver supports Low Frequency (LF) magnetic field communications allowing the changing of measurement/monitoring states of the transmitter by commands sent via the TPM diagnostic tool. The RF signal operates at 315MHz and uses FSK Manchester code modulation. 225816-101 transmits 4 RF packets every 200 seconds.

Description of Operations

Mode of Operation	Explanation	Frequency of Transmission
Storage Mode	No transmission. Measures temperature & pressure	4 words when activation occurs with TPM diagnostic tool
Normal Mode	Measures temperature and pressure. Transmits periodically. Enters this mode from storage when pressure goes above threshold.	<ul style="list-style-type: none"> 4 words every 210 seconds 4 words when activation occurs with TPM diagnostic tool
Alert Mode	Transmits when: a) significant pressure delta detected b) high temperature is detected	8 words every 4 seconds for 1 minute

Mode/Sensor status -shipping, test,parking, driving, first block mode

Battery voltage-Ok, low

Trigger information- LF initiate TM

Pressure- 1.4kPa

temperature-27 deg C

acceleration- 0.5 g

Market - EU, America

Tire type - 450 kPa

Response time -8.14 seconds

ID-

Mx-sensor FCC-ID: WQ8TPMSDF87E

Cloned but sending data after triggering only. Also, looks very different

From these two sensors - 801A2D39 and 801A2A5F - data being transmitted every 3:30 minutes - without triggering or acceleration.

2019-09-03 21:33:46

2019-09-03 21:37:16

2019-09-03 21:40:47

ID 801A2D39 Pres 0.4 psi Temp 77 F BAT OK MODE NA Modulation 315 FM

006b8aad5534d32b55554b3532cd2b4ad54cd3540

00d7155aaa69a656aaaa966a659a5695aa99a6a8

024B801A2D39C148

024B 801A2D39 C148

ID 801A2D39 Pres 0.1 psi Temp 77 F BAT OK MODE NA Modulation 315 FM

006b8aad554cd32b55554b3532cd2b4ad54d32b40

00d7155aaa99a656aaaa966a659a5695aa9a6568

014B801A2D39C12E

014B 801A2D39 C12E

ID 801A2D39 Pres 0.4 psi Temp 78 F BAT OK MODE NA Modulation 315 FM

006b8aad5534d2d355554b3532cd2b4ad54b4cac0

00d7155aaa69a5a6aaaa966a659a5695aa969958

024C801A2D39C197

024C 801A2D39 C197

ID 801A2D39 Pres 0.1 psi Temp 82 F BAT OK MODE NA Modulation 315 FM

006b8aad554cd2b355554b3532cd2b4ad54b352c0

00d7155aaa99a566aaaa966a659a5695aa966a58

014E801A2D39C1A3

014E 801A2D39 C1A3

ID 801A2D39 Pres 0.4 psi Temp 86 F BAT OK MODE NA Modulation 315 FM

006b8aad5534cd5355554b3532cd2b4ad54ab5340

00d7155aaa699aa6aaaa966a659a5695aa956a68

250801A2D39C1E2

0250 801A2D39 C1E2

ID 801A2A5F Pres 0.1 psi Temp 78 F BAT OK MODE NA Modulation 315 FM

006b8aad554cd2d355554b353334caaad54cb2d40

00d7155aaa99a5a6aaaa966a66699555aa9965a8

ID 801A2A5F Pres 0.4 psi Temp 87 F BAT OK MODE NA Modulation 315 FM

006b8aad5534cd4b55554b353334caaad54cccb4

00d7155aaa699a96aaaa966a66699555aa999968

ID 801A2A5F Pres 0.4 psi Temp 80 F BAT OK MODE NA Modulation 315 FM

006b8aad5534d2cb55554b353334caaad54d352c0

00d7155aaa69a596aaaa966a66699555aa9a6a58

ID 801A2A5F Pres 0.4 psi Temp 80 F BAT LOW MODE NA Modulation 315 FM

006b8aad5534d2cb55554b353334caaad52d32cc0

00d7155aaa69a596aaaa966a66699555aa5a6598

ID 801A2A5F Pres 0.4 psi Temp 78 F BAT OK MODE NA Modulation 315 FM

006b8aad5534d2d355554b353334caaad54d53340

00d7155aaa69a5a6aaaa966a66699555aa9aa668

6B8AAD5749A696AAAA966A66699555AA956A98

ID 801A2A5F Pres 0.4 psi Temp 78 F BAT OK MODE NA Modulation 315 FM Repeat

006b8aad5534d2d355554b353334caaad54d53340

00d7155aaa69a5a6aaaa966a66699555aa9aa668

024C801A2A5FC10A

024C 801A 2A5F C10A

ID 801A2A5F Pres 0.4 psi Temp 89 F BAT OK MODE NA Modulation 315 FM

006b8aad5534cd3355554b353334caaad54d32cc0

00d7155aaa699a66aaaa966a66699555aa9a6598

ID 801A2D39 Pres 0.4 psi Temp 77 F BAT LOW MODE NA Modulation 315 FM

006b8aad5534d32b55554b3532cd2b4ad52cd4b40

00d7155aaa69a656aaaa966a659a5695aa59a968

ID 801A2D39 - not triggered

006b8aad554cd2d355554b3532cd2b4ad552acb40

00d7155aaa99a5a6aaaa966a659a5695aaa55968

014C 801A2D39 C0 F6

ID 801A2D39 - not triggered

006b8aad554cd2d355554b3532cd2b4ad552acb40

00d7155aaa99a5a6aaaa966a659a5695aaa55968

ID 801A2D39 - not triggered

006b8aad554cd2d355554b3532cd2b4ad552acb40

00d7155aaa99a5a6aaaa966a659a5695aaa55968

Triggered scan - one by one for each tire. Data length = 154 bytes

ID 02226097 Pres 30.5 psi Temp 75 F BAT OK MODE NA Modulation 315 FM

Ed715569699a66aaa6a6a696aa69955aa9a6954

994A02226097C127

994A 0222 6097 C127

ID 02226097 Pres 30.5 psi Temp 75 F BAT OK MODE NA Modulation 315 FM FR

ID 02226097 Pres 210kPa Temp 23.9C BAT OK MODE NA Modulation 315 FM FR

ed715569699a66aaa6a6a696aa69955aa9a6954

994A 0222 6097 C127

ID 022130A3 Pres 29.3 psi Temp 71 F BAT OK MODE NA Modulation 315 FM

ed715569a59a6aaaa6a6a9a5aa66a55aa969994

ID 022130A3 Pres 29.3 psi Temp 71 F BAT OK MODE NA Modulation 315 FM RR

ID 022130A3 Pres 202kPa Temp 21.7C BAT OK MODE NA Modulation 315 FM RR

Ed715569a59a6aaaa6a6a9a5aa66a55aa969994

9348 0221 30A3 C195

ID 0316ECE6 Pres 32.1 psi Temp 71 F BAT OK MODE NA Modulation 315 FM

Ed715566a99a6aaaa5a996565a56965a99a69a4

A148 0316 ECE6 C524

ID 0316ECE6 Pres 32.1 psi Temp 71 F BAT OK MODE NA Modulation 315 FM

ID 0316ECE6 Pres 221kPa Temp 21.7 C BAT OK MODE NA Modulation 315 FM RL

00715566a99a6aaaa5a996565a56965a99a69a4

11100010101010101100110101010011001101001101010101010101001011010100110010110010101100101101001010

11010010110010110101001100110100110100110100100 (147)

111000101010101(15)

01100110101010011001101001101010101010101001011010100110010110010101100101101001010110100101100101

1010100110011010011010011010(128)

0100 (4)

01100110101010011001101001101010101010101001011010100110010110010101100101101001010110100101100101

1010100110011010011010011010(128) Manchester decode

1010000101001000000000110001011011101100111001101100010100100100(64)

A1480316ECE6C524

A1 48 0316ECE6 C5 24

01715566a99a6aaaa5a996565a56965a99a69a4

Hex to binary (00d715566a99a6aaaa5a996565a56965a99a69a4)

11010111000101010101011001101010100110011010011010101010101010010110101001100101100101011001011010
0101011010010110010110101001100110100110100110100100(152 bits)

110101110001(12 bits)

01010101011001101010100110011010011010101010101010010110101001100101100101011001011010010101101001
011001011010100110011010011010011010(136bits)

0100(4bits)

Manchester decode (IEEE 802)

11111010000101001000000000110001011011101100111001101100010100100100

Binary to hex

FA1480316ECE6C524

A148 0316 ECE6 C524

ID 03171407 Pres 31.9 psi Temp 73 F BAT OK MODE NA Modulation 315 FM FL

01715566aa9a69aaa5a995a99aaa955a9966554

05715566aa9a69aaa5a995a99aaa955a9966554

00715566aa9a69aaa5a995a99aaa955a9966554

00715566aa9a69aaa5a995a99aaa955a9966554

A04903171407C5AF

A049 0317 1407 C5AF

ID 03171407 Pres 31.9 psi Temp 73 F BAT OK MODE NA Modulation 315 FM FL

ed715566aa9a69aaa5a995a99aaa955a9966554

ed715566aa9a69aaa5a995a99aaa955a9966554

ID 03171407 Pres 31.8 psi Temp 73 F BAT OK MODE NA Modulation 315 FM

ID 03171407 Pres 219kPa Temp 22.8 C BAT OK MODE NA Modulation 315 FM FL

0ae2aad2ab34d3554b532b5335552ab5334d348

ed715569559a69aaa5a995a99aaa955a99a69a4

Repeated x7

9F4903171407C524

9F49 0317 1407 C524

E d7 15 56 95 59 a6 9a aa 5a 99 5a 99 aa a9 55 a9 9a 69 a4

E d7 15 56 6a a9 a6 9a aa 5a 99 5a 99 aa a9 55 a9 96 65 54

Raw capture over 5 mins antenna upfront - horizontal above the clock - ign on eng off

| => rtl_433 -d 0 -f 315M -s 1024k -R 0 -X 'n=name,m=FSK_PCM,s=49,l=49,r=50000'

rtl_433 version 18.12-91-gcab7ca9 branch master at 201902131710 inputs file rtl_tcp RTL-SDR SoapySDR

Trying conf file at "rtl_433.conf"...

Trying conf file at "/Users/kv2000in/.config/rtl_433/rtl_433.conf"...

Trying conf file at "/usr/local/etc/rtl_433/rtl_433.conf"...

Trying conf file at "/etc/rtl_433/rtl_433.conf"...

Disabling all device decoders.

Registered 1 out of 120 device decoding protocols []

Found Rafael Micro R820T tuner

[R82XX] PLL not locked!

Sample rate set to 1024000 S/s.

Tuner gain set to Auto.

Tuned to 315.000MHz.

time : 2019-09-05 22:26:57
model : name count : 1 num_rows : 1 rows :
len : 192 data : 0000000000000000000000000000000056959da69894d55
codes : {192}0000000000000000000000000000000056959da69894d55

time : 2019-09-05 22:26:59
model : name count : 1 num_rows : 1 rows :
len : 190 data : 0000000000001515545555555552c34cd0ad2b2b4f3355550
codes : {190}0000000000001515545555555552c34cd0ad2b2b4f3355550

time : 2019-09-05 22:27:06
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:27:06
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:27:24
model : name count : 1 num_rows : 1 rows :
len : 299 data : 0003ffc199999e1e19e1e19e61e1e19e661e61e66661e1e19e199999e6661e1e1e61e1e661c
codes : {299}0003ffc199999e1e19e1e19e61e1e19e661e61e66661e1e19e199999e6661e1e1e61e1e661c

time : 2019-09-05 22:27:33
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cccaab554d355334b2d554abaaaaad332acd3
codes : {160}553cccaab554d355334b2d554abaaaaad332acd3

time : 2019-09-05 22:27:57
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd354aad52cb32b532b355334aaaacab2ab2b
codes : {160}553cd354aad52cb32b532b355334aaaacab2ab2b

time : 2019-09-05 22:28:13
model : name count : 1 num_rows : 1 rows :

len : 297 data : 0007ff878679987867879866787879866799879999878787986666667998787879878798670
codes : {297}0007ff878679987867879866787879866799879999878787986666667998787879878798670

time : 2019-09-05 22:28:19
model : name count : 1 num_rows : 1 rows :
len : 163 data : e0a79a6a955aa559aa599aa6695555955a5996
codes : {163}e0a79a6a955aa559aa599aa6695555955a5996

time : 2019-09-05 22:28:22
model : name count : 1 num_rows : 1 rows :
len : 75 data : 0a9e3354ab34ae4cb42
codes : {75}0a9e3354ab34ae4cb42

time : 2019-09-05 22:28:22
model : name count : 1 num_rows : 1 rows :
len : 88 data : f9a7aa9569757584ccca8f
codes : {88}f9a7aa9569757584ccca8f

time : 2019-09-05 22:28:24
model : name count : 1 num_rows : 1 rows :
len : 298 data : 0007ffc333cc3c33c333333cc3c3c33ccc3ccc33333c3c3c33cccccc333c3c3c3c3c33cc38
codes : {298}0007ffc333cc3c33c333333cc3c3c33ccc3ccc33333c3c3c33cccccc333c3c3c3c3c33cc38

time : 2019-09-05 22:28:27
model : name count : 1 num_rows : 1 rows :
len : 290 data : 03ffc199e1e1e1e1e6661e619e19e1999999999e6661e199f1e66619e661e1e66199e19c
codes : {290}03ffc199e1e1e1e1e6661e619e19e1999999999e6661e199f1e66619e661e1e66199e19c

time : 2019-09-05 22:28:29
model : name count : 1 num_rows : 1 rows :
len : 160 data : 543cc15554b2f528b2ccd0b353335557368accd3
codes : {160}543cc15554b2f528b2ccd0b353335557368accd3

time : 2019-09-05 22:28:46
model : name count : 1 num_rows : 1 rows :
len : 139 data : ffce6398c6318c6318c7fe6318c1f063e62
codes : {139}ffce6398c6318c6318c7fe6318c1f063e62

time : 2019-09-05 22:28:46
model : name count : 1 num_rows : 1 rows :
len : 192 data : 5555555655aa996a99a9a666696aa995666956a956656657
codes : {192}5555555655aa996a99a9a666696aa995666956a956656657

```
time : 2019-09-05 22:29:09
model : name      count : 1      num_rows : 1      rows :
len : 298      data : 0007ff833333cc33cc333333c33c3c3cc3333ccc3cccc3c3c3333cccc3cc33333333cc3c3cc38
codes : {298}0007ff833333cc33cc333333c33c3c3cc3333ccc3cccc3c3c3333cccc3cc33333333cc3c3cc38
-----
time : 2019-09-05 22:29:14
model : name      count : 1      num_rows : 1      rows :
len : 298      data : 0007ff83c33ccc3c33c3cc333c3c3cc333cccc33333c3c3c33ccccccc333c3c3c33333cc338
codes : {298}0007ff83c33ccc3c33c3cc333c3c3cc333cccc33333c3c3c33ccccccc333c3c3c33333cc338
-----
time : 2019-09-05 22:29:29
model : name      count : 1      num_rows : 1      rows :
len : 298      data : 0007ff83333333c3c33c3c3cc3c3c33ccc3cc3333333c3c3cc3ccccccc3333c3c3c33cccccc38
codes : {298}0007ff83333333c3c33c3c3cc3c3c33ccc3cc3333333c3c3cc3ccccccc3333c3c3c33cccccc38
-----
time : 2019-09-05 22:29:53
model : name      count : 1      num_rows : 1      rows :
len : 160      data : 553cd352b5532d4b335335554b54aab2b332ccab
codes : {160}553cd352b5532d4b335335554b54aab2b332ccab
-----
time : 2019-09-05 22:29:53
model : name      count : 1      num_rows : 1      rows :
len : 160      data : 553cd352b5532d4b335335554b54aab2b332ccab
codes : {160}553cd352b5532d4b335335554b54aab2b332ccab
-----
time : 2019-09-05 22:29:54
model : name      count : 1      num_rows : 1      rows :
len : 160      data : 553cd354aad52acd52ccd4cd5334aaaacaad2ccb
codes : {160}553cd354aad52acd52ccd4cd5334aaaacaad2ccb
-----
time : 2019-09-05 22:30:09
model : name      count : 1      num_rows : 1      rows :
len : 297      data : 0007ff86667986798666678678787986679998666678786787999986667999999866667870
codes : {297}0007ff86667986798666678678787986679998666678786787999986667999999866667870
-----
time : 2019-09-05 22:30:15
model : name      count : 1      num_rows : 1      rows :
len : 298      data : 0007ff83c33ccc3c33c3cc333c3c3cc333ccc333333c3c3c33ccccccc333c3c3c33cccc338
codes : {298}0007ff83c33ccc3c33c3cc333c3c3cc333ccc333333c3c3c33ccccccc333c3c3c33cccc338
-----
time : 2019-09-05 22:30:25
model : name      count : 1      num_rows : 1      rows :
len : 154      data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
```

time : 2019-09-05 22:30:25
model : name count : 1 num_rows : 1 rows :
len : 154 data : cd715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}cd715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:30:25
model : name count : 1 num_rows : 1 rows :
len : 154 data : cd715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}cd715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:30:25
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:30:31
model : name count : 1 num_rows : 1 rows :
len : 298 data : 0007ff8333333c3c33c3c33cc3c3c3ccc3cc3cccc3c3c333333cccc3c3c3cc3c3ccc38
codes : {298}0007ff8333333c3c33c3c33cc3c3c3ccc3cc3cccc3c3c333333cccc3c3c3cc3c3ccc38

time : 2019-09-05 22:30:35
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:30:35
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:30:35
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:30:35
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:31:10

```
model : name      count : 1      num_rows : 1      rows :  
len : 297      data : 0007ff866679867986666786787879866799866666787879986666678679999998666679870  
codes : {297}0007ff866679867986666786787879866799866666787879986666678679999998666679870
```

```
-----  
time : 2019-09-05 22:31:16  
model : name      count : 1      num_rows : 1      rows :  
len : 298      data : 0007ff83c33ccc3c33c3cc333c3c3cc333ccc3cccc3c3c3cc333333ccc3c3c3cc3c3cc338  
codes : {298}0007ff83c33ccc3c33c3cc333c3c3cc333ccc3cccc3c3c3cc333333ccc3c3c3cc3c3cc338
```

```
-----  
time : 2019-09-05 22:31:30  
model : name      count : 1      num_rows : 1      rows :  
len : 160      data : 553cd354aad52acd52ccd4cd5334aaaacaad2ccb  
codes : {160}553cd354aad52acd52ccd4cd5334aaaacaad2ccb
```

```
-----  
time : 2019-09-05 22:31:34  
model : name      count : 1      num_rows : 1      rows :  
len : 298      data : 0003ffc333333c3c33c3c33cc3c3c33ccc3ccc333333c3c3cc3cccc3333c3c3c3333ccc38  
codes : {298}0003ffc333333c3c33c3c33cc3c3c33ccc3ccc333333c3c3cc3cccc3333c3c3c3333ccc38
```

```
-----  
time : 2019-09-05 22:31:44  
model : name      count : 1      num_rows : 1      rows :  
len : 160      data : 553cccaab352d2aad3532b2b4ad4aab2cacab4cb  
codes : {160}553cccaab352d2aad3532b2b4ad4aab2cacab4cb
```

```
-----  
time : 2019-09-05 22:31:44  
model : name      count : 1      num_rows : 1      rows :  
len : 160      data : 553cccaab352d2aad3532b2b4ad4aab2cacab4cb  
codes : {160}553cccaab352d2aad3532b2b4ad4aab2cacab4cb
```

```
-----  
time : 2019-09-05 22:32:10  
model : name      count : 1      num_rows : 1      rows :  
len : 297      data : 0007ff866679867986666786787879866799879999878786679999987986666667987879870  
codes : {297}0007ff866679867986666786787879866799879999878786679999987986666667987879870
```

Raw capture over 5 mins antenna upfront - parallel to the car body - above the clock - ign on eng off

```
| => rtl_433 -d 0 -f 315M -s 1024k -R 0 -X 'n=name,m=FSK_PCM,s=49,l=49,r=50000'  
rtl_433 version 18.12-91-gcab7ca9 branch master at 201902131710 inputs file rtl_tcp RTL-SDR SoapySDR  
Trying conf file at "rtl_433.conf"..  
Trying conf file at "/Users/kv2000in/.config/rtl_433/rtl_433.conf"..  
Trying conf file at "/usr/local/etc/rtl_433/rtl_433.conf"..  
Trying conf file at "/etc/rtl_433/rtl_433.conf"..  
Disabling all device decoders.  
Registered 1 out of 120 device decoding protocols [ ]  
Found Rafael Micro R820T tuner  
[R82XX] PLL not locked!
```

Sample rate set to 1224000 S/s.

Tuner gain set to Auto.

Tuned to 315.000MHz.

time : 2019-09-05 22:33:40
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:33:40
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:33:40
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:33:40
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:34:04
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:34:07
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd354aad52acd2b2b2b3caccb5555354aab33
codes : {160}553cd354aad52acd2b2b2b3caccb5555354aab33

time : 2019-09-05 22:35:21
model : name count : 1 num_rows : 1 rows :
len : 98 data : fd3ccd70d32534ad2a72cb528
codes : {98}fd3ccd70d32534ad2a72cb528

time : 2019-09-05 22:35:21
model : name count : 1 num_rows : 1 rows :
len : 64 data : ac195555a6985a57
codes : {64}ac195555a6985a57

time : 2019-09-05 22:35:40
model : name count : 1 num_rows : 1 rows :
len : 298 data : 0007ff8333cc3c33c3333333cc3c3c33ccc3cc333333c3c3c33cccccc333c3c3c3cc3c3cc38
codes : {298}0007ff8333cc3c33c3333333cc3c3c33ccc3cc333333c3c3c33cccccc333c3c3c3cc3c3cc38

time : 2019-09-05 22:35:53
model : name count : 1 num_rows : 1 rows :
len : 160 data : 5555555656aa5aa6a96a699695a567996965aa69
codes : {160}5555555656aa5aa6a96a699695a567996965aa69

time : 2019-09-05 22:35:56
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553ccd5554b2cb332aab2b32accf5555357ab2cb
codes : {160}553ccd5554b2cb332aab2b32accf5555357ab2cb

time : 2019-09-05 22:36:11
model : name count : 1 num_rows : 1 rows :
len : 73 data : 003c49aa5168909f760
codes : {73}003c49aa5168909f760

time : 2019-09-05 22:36:46
model : name count : 1 num_rows : 1 rows :
len : 298 data : 0003ffc333333c3c33c3c33cc3c3c33ccc3cc3cccc3c3c333333cccc3c3c3cc3c3ccc38
codes : {298}0003ffc333333c3c33c3c33cc3c3c33ccc3cc3cccc3c3c333333cccc3c3c3cc3c3ccc38

time : 2019-09-05 22:37:10
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553ccd4accb2b534d34ccab4b52b554d4cb4aab3
codes : {160}553ccd4accb2b534d34ccab4b52b554d4cb4aab3

time : 2019-09-05 22:37:20
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd354a2d52acd2b2b2b34accb5555354aab30
codes : {160}553cd354a2d52acd2b2b2b34accb5555354aab30

time : 2019-09-05 22:37:21
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a69aaa6a6a696aa69955aaa6a9a4
codes : {154}ed7155696a9a69aaa6a6a696aa69955aaa6a9a4

time : 2019-09-05 22:38:22
model : name count : 1 num_rows : 1 rows :

```
len      : 298      data      : 0007ff83c33ccc3c33c3cc333c3c3cc333cccc3333c3c3c33cccccc333c3c3c33333cc338
codes    : {298}0007ff83c33ccc3c33c3cc333c3c3cc333cccc3333c3c3c33cccccc333c3c3c33333cc338
-----
time     : 2019-09-05 22:39:54
model    : name      count    : 1          num_rows : 1          rows      :
len      : 298      data      : 0007ff8333333c3c33c3c33cc3c3c33ccc3cc3cccc3c3c33c333333cccc3c3c3cc3c3ccc38
codes    : {298}0007ff8333333c3c33c3c33cc3c3c33ccc3cc3cccc3c3c33c333333cccc3c3c3cc3c3ccc38
^CSignal caught, exiting!
```

Raw capture over 5 mins antenna upfront - parallel to the car body - under the car - ign on eng ON

```
| => rtl_433 -d 0 -f 315M -s 1024k -R 0 -X 'n=name,m=FSK_PCM,s=49,l=49,r=50000'
rtl_433 version 18.12-91-gcab7ca9 branch master at 201902131710 inputs file rtl_tcp RTL-SDR SoapySDR
Trying conf file at "rtl_433.conf"...
Trying conf file at "/Users/kv2000in/.config/rtl_433/rtl_433.conf"...
Trying conf file at "/usr/local/etc/rtl_433/rtl_433.conf"...
Trying conf file at "/etc/rtl_433/rtl_433.conf"...
Disabling all device decoders.
Registered 1 out of 120 device decoding protocols [ ]
Found Rafael Micro R820T tuner
[R82XX] PLL not locked!
Sample rate set to 1024000 S/s.
Tuner gain set to Auto.
Tuned to 315.000MHz.
```

```
-----
time     : 2019-09-05 22:42:07
model    : name      count    : 1          num_rows : 1          rows      :
len      : 69      data      : 553cd354aad52acd28
codes    : {69}553cd354aad52acd28
-----
```

```
-----
time     : 2019-09-05 22:43:02
model    : name      count    : 1          num_rows : 1          rows      :
len      : 296      data      : 000fff0cccccf0f0cf0f0cf30f0f0cf330f30f33330f0f0cf0cccccf3330f0f0f30f0f330e
codes    : {296}000fff0cccccf0f0cf0f0cf30f0f0cf330f30f33330f0f0cf0cccccf3330f0f0f30f0f330e
-----
```

```
-----
time     : 2019-09-05 22:43:56
model    : name      count    : 1          num_rows : 1          rows      :
len      : 154      data      : ed715569699a69aaa6a6a696aa69955aaa99654
codes    : {154}ed715569699a69aaa6a6a696aa69955aaa99654
-----
```

```
-----
time     : 2019-09-05 22:43:56
model    : name      count    : 1          num_rows : 1          rows      :
len      : 154      data      : ed715569699a69aaa6a6a696aa69955aaa99654
codes    : {154}ed715569699a69aaa6a6a696aa69955aaa99654
-----
```

```
-----
time     : 2019-09-05 22:43:56
```

model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:43:56
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:44:09
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:44:09
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:44:09
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:44:09
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:46:09
model : name count : 1 num_rows : 1 rows :
len : 296 data : 001ffe0ccccf0f0cf0f0cf30f0f0cf330f30f33330f0f0cf0ccccf3330f0f0f30f0f330e
codes : {296}001ffe0ccccf0f0cf0f0cf30f0f0cf330f30f33330f0f0cf0ccccf3330f0f0f30f0f330e

time : 2019-09-05 22:47:09
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a69aaa6a6a696aa69955aaa6a9a4
codes : {154}ed7155696a9a69aaa6a6a696aa69955aaa6a9a4

time : 2019-09-05 22:47:09
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a69aaa6a6a696aa69955aaa6a9a4
codes : {154}ed7155696a9a69aaa6a6a696aa69955aaa6a9a4

time : 2019-09-05 22:47:09
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a69aaa6a6a696aa69955aaa6a9a4
codes : {154}ed7155696a9a69aaa6a6a696aa69955aaa6a9a4

time : 2019-09-05 22:47:09
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a69aaa6a6a696aa69955aaa6a9a4
codes : {154}ed7155696a9a69aaa6a6a696aa69955aaa6a9a4

time : 2019-09-05 22:47:12
model : name count : 1 num_rows : 1 rows :
len : 297 data : 000fff066666787867878679878786799879986666787879879999986667878786666799870
codes : {297}000fff066666787867878679878786799879986666787879879999986667878786666799870

time : 2019-09-05 22:47:24
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:47:24
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:47:24
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

93 48 022130A3 C0 92
9348022130A3C092

time : 2019-09-05 22:47:24
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:47:30
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd354b4caccab2aab2cb34accaab2d4ab2d4b
codes : {160}553cd354b4caccab2aab2cb34accaab2d4ab2d4b

```
time      : 2019-09-05 22:48:15
model     : name      count   : 1          num_rows : 1          rows      :
len       : 296      data    : 000fff0cccccf0f0cf0f0cf30f0f0cf330f30cccccf0f0f30f333330ccccf0f0f0cf333330e
codes     : {296}000fff0cccccf0f0cf0f0cf30f0f0cf330f30cccccf0f0f30f333330ccccf0f0f0cf333330e
^CSignal caught, exiting!
```

Raw capture over 5 mins antenna near FL - parallel to the car body -- ign cycle engine on then off

```
| => rtl_433 -d 0 -f 315M -s 1024k -R 0 -X 'n=name,m=FSK_PCM,s=49,l=49,r=50000'
rtl_433 version 18.12-91-gcab7ca9 branch master at 201902131710 inputs file rtl_tcp RTL-SDR SoapySDR
Trying conf file at "rtl_433.conf"...
Trying conf file at "/Users/kv2000in/.config/rtl_433/rtl_433.conf"...
Trying conf file at "/usr/local/etc/rtl_433/rtl_433.conf"...
Trying conf file at "/etc/rtl_433/rtl_433.conf"...
Disabling all device decoders.
Registered 1 out of 120 device decoding protocols [ ]
Found Rafael Micro R820T tuner
[R82XX] PLL not locked!
Sample rate set to 1024000 S/s.
Tuner gain set to Auto.
Tuned to 315.000MHz.
```

```
-----
time      : 2019-09-05 22:53:28
model     : name      count   : 1          num_rows : 1          rows      :
len       : 298      data    : 0007ff83333333c3c33c3c33cc3c3c3ccc3ccc33333c3c3cc3cccccc3333c3c3c33333ccc38
codes     : {298}0007ff83333333c3c33c3c33cc3c3c3ccc3ccc33333c3c3cc3cccccc3333c3c3c33333ccc38
-----
```

```
-----
time      : 2019-09-05 22:53:33
model     : name      count   : 1          num_rows : 1          rows      :
len       : 160      data    : 553cd354aad52cb32b532b355334aaaacab2ab2b
codes     : {160}553cd354aad52cb32b532b355334aaaacab2ab2b
-----
```

```
-----
time      : 2019-09-05 22:53:45
model     : name      count   : 1          num_rows : 1          rows      :
len       : 297      data    : 0007ff866679867986666786787879866799879999878786679999987986666667987879870
codes     : {297}0007ff866679867986666786787879866799879999878786679999987986666667987879870
-----
```

```
-----
time      : 2019-09-05 22:53:49
model     : name      count   : 1          num_rows : 1          rows      :
len       : 160      data    : 553cd354aad52acd52ccd4cd5334aaaacaad2ccb
codes     : {160}553cd354aad52acd52ccd4cd5334aaaacaad2ccb
-----
```

```
-----
time      : 2019-09-05 22:54:04
model     : name      count   : 1          num_rows : 1          rows      :
len       : 154      data    : ed715569699a69aaa6a6a696aa69955aaa99654
codes     : {154}ed715569699a69aaa6a6a696aa69955aaa99654
-----
```


time : 2019-09-05 22:54:04
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:54:04
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:54:04
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:54:22
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:54:22
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:54:22
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:54:22
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:54:26
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553ccd4ad4ad2d3534b4d32b4b52aaaad5354ccb
codes : {160}553ccd4ad4ad2d3534b4d32b4b52aaaad5354ccb

time : 2019-09-05 22:54:31
model : name count : 1 num_rows : 1 rows :

```
len      : 297      data      : 0007ff866666787867878679878786799879866666787879879999986667878786799999870
codes    : {297}0007ff866666787867878679878786799879866666787879879999986667878786799999870
-----
time     : 2019-09-05 22:54:35
model    : name      count    : 1          num_rows : 1          rows      :
len      : 160      data      : 553ccd4ad4ad2d32d54cd32ab533554d2accb553
codes    : {160}553ccd4ad4ad2d32d54cd32ab533554d2accb553
-----
time     : 2019-09-05 22:54:35
model    : name      count    : 1          num_rows : 1          rows      :
len      : 160      data      : 553ccd4ad4ad2d32d54cd32ab533554d2accb553
codes    : {160}553ccd4ad4ad2d32d54cd32ab533554d2accb553
-----
time     : 2019-09-05 22:54:35
model    : name      count    : 1          num_rows : 1          rows      :
len      : 160      data      : 553ccd4ad4ad2d32d54cd32ab533554d2accb553
codes    : {160}553ccd4ad4ad2d32d54cd32ab533554d2accb553
-----
time     : 2019-09-05 22:54:35
model    : name      count    : 1          num_rows : 1          rows      :
len      : 160      data      : 553ccd4ad4ad2d32d54cd32ab533554d2accb553
codes    : {160}553ccd4ad4ad2d32d54cd32ab533554d2accb553
-----
time     : 2019-09-05 22:54:46
model    : name      count    : 1          num_rows : 1          rows      :
len      : 297      data      : 0007ff86667986798666678678787986679998666678786787999986667999999866667870
codes    : {297}0007ff86667986798666678678787986679998666678786787999986667999999866667870
-----
time     : 2019-09-05 22:55:09
model    : name      count    : 1          num_rows : 1          rows      :
len      : 160      data      : 553cd354aad52cb32b532b355334aaaacab2ab2b
codes    : {160}553cd354aad52cb32b532b355334aaaacab2ab2b
-----
time     : 2019-09-05 22:55:25
model    : name      count    : 1          num_rows : 1          rows      :
len      : 160      data      : 553cd354aad52acd52ccd4cd5334aaaacaad2ccb
codes    : {160}553cd354aad52acd52ccd4cd5334aaaacaad2ccb
-----
time     : 2019-09-05 22:55:31
model    : name      count    : 1          num_rows : 1          rows      :
len      : 160      data      : 553cd3552cacd55553332d54b52aaab2d334d52b
codes    : {160}553cd3552cacd55553332d54b52aaab2d334d52b
-----
```

```
time : 2019-09-05 22:55:40
model : name      count : 1      num_rows : 1      rows :
len : 160      data : 553cd354b4b54d4cad332d34b52caab2d2b52c2b
codes : {160}553cd354b4b54d4cad332d34b52caab2d2b52c2b
-----
time : 2019-09-05 22:55:47
model : name      count : 1      num_rows : 1      rows :
len : 297      data : 0007ff866679867986666786787879866799866666787867879999866679999999999867870
codes : {297}0007ff866679867986666786787879866799866666787867879999866679999999999867870
-----
time : 2019-09-05 22:56:32
model : name      count : 1      num_rows : 1      rows :
len : 65      data : 553cd354aad52acd0
codes : {65}553cd354aad52acd0
-----
time : 2019-09-05 22:56:32
model : name      count : 1      num_rows : 1      rows :
len : 95      data : 565656695996aaaa6a955666
codes : {95}565656695996aaaa6a955666
-----
time : 2019-09-05 22:56:33
model : name      count : 1      num_rows : 1      rows :
len : 160      data : 553cad2b333352d2acaccd2ab54d554d52cd32cb
codes : {160}553cad2b333352d2acaccd2ab54d554d52cd32cb
-----
time : 2019-09-05 22:56:33
model : name      count : 1      num_rows : 1      rows :
len : 160      data : 553cad2b333352d2acaccd2ab54d554d52cd32cb
codes : {160}553cad2b333352d2acaccd2ab54d554d52cd32cb
-----
time : 2019-09-05 22:56:33
model : name      count : 1      num_rows : 1      rows :
len : 160      data : 553cad2b333352d2acaccd2ab54d554d52cd32cb
codes : {160}553cad2b333352d2acaccd2ab54d554d52cd32cb
-----
time : 2019-09-05 22:56:36
model : name      count : 1      num_rows : 1      rows :
len : 298      data : 0007ff8333333c3c33c3c33cc3c3c3ccc3ccc33333c3c3cc3ccccc3333c3c3c33333ccc38
codes : {298}0007ff8333333c3c33c3c33cc3c3c3ccc3ccc33333c3c3cc3ccccc3333c3c3c33333ccc38
-----
time : 2019-09-05 22:56:44
model : name      count : 1      num_rows : 1      rows :
len : 160      data : 553cad2b33334d53552ccd2ab54d554d52ccd34b
codes : {160}553cad2b33334d53552ccd2ab54d554d52ccd34b
```

time : 2019-09-05 22:56:44
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cad2b333352d2ad4ccd4d4ab5554d535354ab
codes : {160}553cad2b333352d2ad4ccd4d4ab5554d535354ab

time : 2019-09-05 22:56:44
model : name count : 1 num_rows : 1 rows :
len : 95 data : 553cad2b333352d2ad4ccc4c
codes : {95}553cad2b333352d2ad4ccc4c

time : 2019-09-05 22:56:45
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cad2b33334b354b4b32b34ab4aab2acab54cb
codes : {160}553cad2b33334b354b4b32b34ab4aab2acab54cb

time : 2019-09-05 22:56:45
model : name count : 1 num_rows : 1 rows :
len : 122 data : 553cad2b33334b354b4b32b34ab4aa8
codes : {122}553cad2b33334b354b4b32b34ab4aa8

time : 2019-09-05 22:56:45
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cad2b33334b354b4b32b34ab4aab2acab54cb
codes : {160}553cad2b33334b354b4b32b34ab4aab2acab54cb

time : 2019-09-05 22:56:48
model : name count : 1 num_rows : 1 rows :
len : 297 data : 0007ff866679867986666786787879866799879999878798786666799986666666678667870
codes : {297}0007ff866679867986666786787879866799879999878798786666799986666666678667870

time : 2019-09-05 22:57:00
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd354aad52acd52ccd4cb5334aaaacab52b4b
codes : {160}553cd354aad52acd52ccd4cb5334aaaacab52b4b

time : 2019-09-05 22:57:33
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:57:33
model : name count : 1 num_rows : 1 rows :

len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:57:33
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:57:33
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569699a69aaa6a6a696aa69955aaa99654
codes : {154}ed715569699a69aaa6a6a696aa69955aaa99654

time : 2019-09-05 22:57:36
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:57:37
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:57:37
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:57:37
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64
codes : {154}ed715569a59a6aaaa6a6a9a5aa66a55aaa69a64

time : 2019-09-05 22:57:38
model : name count : 1 num_rows : 1 rows :
len : 298 data : 0007ff83c33ccc3c33c3cc333c3c3cc333ccc333333c3c3c33ccccccc333c3c3c33cccc338
codes : {298}0007ff83c33ccc3c33c3cc333c3c3cc333ccc333333c3c3c33ccccccc333c3c3c33cccc338

time : 2019-09-05 22:57:39
model : name count : 1 num_rows : 1 rows :
len : 298 data : 0007ff83333333c3c33c3c33cc3c3c3ccc3cc333333c3c3cc3cccc3333c3c3c3cccc38
codes : {298}0007ff83333333c3c33c3c33cc3c3c3ccc3cc333333c3c3cc3cccc3333c3c3c3cccc38

```
time : 2019-09-05 22:57:48
model : name count : 1 num_rows : 1 rows :
len : 298 data : 0007ff83333cc33cc33333c3c3cc333cccc33333c3c3ccccc3333cccccccc33333c38
codes : {298}0007ff83333cc33cc33333c3c3cc333cccc33333c3c3ccccc3333cccccccc33333c38
-----
time : 2019-09-05 22:58:35
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd354aad52acd52ccd4cd5334aaaacaad2ccb
codes : {160}553cd354aad52acd52ccd4cd5334aaaacaad2ccb
-----
time : 2019-09-05 22:58:39
model : name count : 1 num_rows : 1 rows :
len : 298 data : 0007ff83c33ccc3c33c3cc333c3c3cc333ccc3cccc3c3c3cc333333ccc3c3c3cc3c3cc338
codes : {298}0007ff83c33ccc3c33c3cc333c3c3cc333ccc3cccc3c3c3cc333333ccc3c3c3cc3c3cc338
-----
time : 2019-09-05 22:58:41
model : name count : 1 num_rows : 1 rows :
len : 297 data : 0007ff866666787867878679878786799879879999878786786666679998787879878799870
codes : {297}0007ff866666787867878679878786799879879999878786786666679998787879878799870
-----
time : 2019-09-05 22:58:49
model : name count : 1 num_rows : 1 rows :
len : 297 data : 0007ff866679867986666786787879866799866666787867879999866679999999999867870
codes : {297}0007ff866679867986666786787879866799866666787867879999866679999999999867870
^CSignal caught, exiting!
```

TPMS Relearn according to Autel help

```
| => rtl_433 -d 0 -f 315M -s 1024k -R 0 -X 'n=name,m=FSK_PCM,s=49,l=49,r=50000'
rtl_433 version 18.12-91-gcab7ca9 branch master at 201902131710 inputs file rtl_tcp RTL-SDR SoapySDR
Trying conf file at "rtl_433.conf"...
Trying conf file at "/Users/kv2000in/.config/rtl_433/rtl_433.conf"...
Trying conf file at "/usr/local/etc/rtl_433/rtl_433.conf"...
Trying conf file at "/etc/rtl_433/rtl_433.conf"...
Disabling all device decoders.
Registered 1 out of 120 device decoding protocols [ ]
Found Rafael Micro R820T tuner
[R82XX] PLL not locked!
Sample rate set to 1024000 S/s.
Tuner gain set to Auto.
Tuned to 315.000MHz.
```

```
-----
time : 2019-09-07 19:12:06
model : name count : 1 num_rows : 1 rows :
len : 163 data : 0000000000000000000000002b54928565a6a59996
codes : {163}0000000000000000000000002b54928565a6a59996
```

```
time      : 2019-09-07 19:13:00
model     : name      count   : 1      num_rows : 1      rows    :
len       : 161      data    : 2c9e6959ba69aa5957a669795ab68ab5165669a98
codes     : {161}2c9e6959ba69aa5957a669795ab68ab5165669a98
```

```
time      : 2019-09-07 19:13:02  
model     : name          count    : 1           num_rows   : 1           rows       :  
len       : 345         data      : 3ffffffffbfdfbffbf8fffffffffffdfff7ffc3fbf7fffffff9ff9ffffffffffdffffffffff8  
codes     : {345}3ffffffffbfdfbffbf8fffffffffffdfff7ffc3fbf7fffffff9ff9ffffffffffdffffffffff8
```

```
time      : 2019-09-07 19:13:02
model     : name      count   : 1          num_rows : 1          rows      :
len       : 346       data    : 7ffbf#####3feffdbfe7fd7#####feffbf#####d#####dffc
codes     : {346}7ffbf#####3feffdbfe7fd7#####feffbf#####d#####dffc
```

```
time      : 2019-09-07 19:13:05
model     : name      count   : 1          num_rows : 1          rows      :
len       : 348      data    : 3fff7ffefe7ffffffffffff67eff87ffe7ffff3bffffdff17fffffffffffffe7ffff9ffdbf
codes     : {348}3fff7ffefe7ffffffffffff67eff87ffe7ffff3bffffdff17fffffffffffffe7ffff9ffdbf
```

```
time      : 2019-09-07 19:13:05
model     : name      count   : 1      num_rows : 1      rows      :
len       : 348      data    : 7ffffffffffffffffffffdf3fffe7fffffffffe7fffffffffbffffffffffff77fff
codes     : {348}7ffffffffffffffffffffdf3fffe7fffffffffe7fffffffffbffffffffffff77fff
```

```
time      : 2019-09-07 19:13:13
model     : name      count   : 1      num_rows : 1      rows      :
len       : 154      data    : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes     : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
```

```
time      : 2019-09-07 19:13:13
model     : name      count   : 1      num_rows : 1      rows      :
len       : 154      data    : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes     : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
```

```
time      : 2019-09-07 19:13:28
model     : name      count   : 1      num_rows : 1      rows      :
len       : 160      data    : 553ccd54cd32cab34b34d2ccb52d55552d554b2b
codes     : {160}553ccd54cd32cab34b34d2ccb52d55552d554b2b
```

```
time      : 2019-09-07 19:13:37
model     : name      count   : 1      num rows : 1      rows      :
```

len : 154 data : 01715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}01715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:13:37
model : name count : 1 num_rows : 1 rows :
len : 154 data : 00015569599a95aaa5a995a99aaa955a99a69a4
codes : {154}00015569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:13:47
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aa966664
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aa966664

time : 2019-09-07 19:13:53
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aa9a65a4
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aa9a65a4

time : 2019-09-07 19:13:57
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aa9a65a4
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aa9a65a4

time : 2019-09-07 19:14:08
model : name count : 1 num_rows : 1 rows :
len : 154 data : 05715566aa9a6aaaa5a996565a56965a9955654
codes : {154}05715566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:14:32
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:14:32
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:14:58
model : name count : 1 num_rows : 1 rows :
len : 346 data : 05ffffff7fffffffffffffffffffeffffff7ffffffeffffffffffff3fffffffffffffec
codes : {346}05ffffff7fffffffffffffffffffeffffff7ffffffeffffffffffff3fffffffffffffec

time : 2019-09-07 19:16:28
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:16:28
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:16:39
model : name count : 1 num_rows : 1 rows :
len : 83 data : 553ccc5fffbacabb483c4
codes : {83}553ccc5fffbacabb483c4

time : 2019-09-07 19:17:28
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}ed715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:17:28
model : name count : 1 num_rows : 1 rows :
len : 154 data : 0d715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}0d715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:17:28
model : name count : 1 num_rows : 1 rows :
len : 154 data : 00715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}00715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:17:28
model : name count : 1 num_rows : 1 rows :
len : 154 data : 01715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}01715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:17:28
model : name count : 1 num_rows : 1 rows :
len : 154 data : 00715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}00715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:17:28
model : name count : 1 num_rows : 1 rows :
len : 154 data : 81715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}81715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:17:45
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aa9a65a4
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aa9a65a4

time : 2019-09-07 19:17:45
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aa9a65a4
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aa9a65a4

time : 2019-09-07 19:17:56
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715566aa9a6aaaa5a996565a56965a9955654
codes : {154}ed715566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:17:56
model : name count : 1 num_rows : 1 rows :
len : 154 data : 05715566aa9a6aaaa5a996565a56965a9955654
codes : {154}05715566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:17:56
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715566aa9a6aaaa5a996565a56965a9955654
codes : {154}ed715566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:17:56
model : name count : 1 num_rows : 1 rows :
len : 153 data : 0ae2aacd5534d5554b532cacb4ad2cb532aaca8
codes : {153}0ae2aacd5534d5554b532cacb4ad2cb532aaca8

time : 2019-09-07 19:18:01
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:18:01
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:18:18
model : name count : 1 num_rows : 1 rows :

```
len      : 161      data      : 453cd350b6e101ec1fd6349c12648b8c74b2499f8
codes    : {161}453cd350b6e101ec1fd6349c12648b8c74b2499f8
```

```
-----
time     : 2019-09-07 19:19:04
model    : name      count    : 1          num_rows : 1          rows      :
len      : 162      data      : 013ced534c5299a9994990ccac06aaa94d56b232c
codes    : {162}013ced534c5299a9994990ccac06aaa94d56b232c
```

```
-----
time     : 2019-09-07 19:19:11
model    : name      count    : 1          num_rows : 1          rows      :
len      : 160      data      : 553ccd54ad34acccad532d4cb52b554d2caab533
codes    : {160}553ccd54ad34acccad532d4cb52b554d2caab533
```

```
-----
time     : 2019-09-07 19:19:11
model    : name      count    : 1          num_rows : 1          rows      :
len      : 161      data      : 553ccd54adb4ac4656a996a65a9582a006555b998
codes    : {161}553ccd54adb4ac4656a996a65a9582a006555b998
```

```
-----
time     : 2019-09-07 19:19:11
model    : name      count    : 1          num_rows : 1          rows      :
len      : 160      data      : 553ccd54ad34acccad532d4cb52b554d2caab533
codes    : {160}553ccd54ad34acccad532d4cb52b554d2caab533
```

```
-----
time     : 2019-09-07 19:19:14
model    : name      count    : 1          num_rows : 1          rows      :
len      : 91       data      : 011cc754a17fe0040812004
codes    : {91}011cc754a17fe0040812004
```

```
-----
time     : 2019-09-07 19:19:33
model    : name      count    : 1          num_rows : 1          rows      :
len      : 200      data      : 15555555a95655696596569a55a55556659659669659996a5c
codes    : {200}15555555a95655696596569a55a55556659659669659996a5c
```

^CSignal caught, exiting!

Raw Capture with triggering new sensors (FL, RL) in the end to demonstrate antenna position was not an issue

~ @ mac (kv2000in)

| => rtl_433 -d 0 -f 315M -s 1024k -R 0 -X 'n=name,m=FSK_PCM,s=49,l=49,r=50000'

rtl_433 version 18.12-91-gcab7ca9 branch master at 201902131710 inputs file rtl_tcp RTL-SDR SoapySDR

Trying conf file at "rtl_433.conf"...

Trying conf file at "/Users/kv2000in/.config/rtl_433/rtl_433.conf"...

Trying conf file at "/usr/local/etc/rtl_433/rtl_433.conf"...

Trying conf file at "/etc/rtl_433/rtl_433.conf"...

Disabling all device decoders.

Registered 1 out of 120 device decoding protocols []

Found Rafael Micro R820T tuner

[R82XX] PLL not locked!

Sample rate set to 1024000 S/s.

Tuner gain set to Auto.

Tuned to 315.000MHz.

time : 2019-09-07 19:23:30
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:23:30
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:25:00
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:25:00
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:27:01
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a95aaa6a6a9a5aa66a55aaa65654
codes : {154}ed715569a99a95aaa6a6a9a5aa66a55aaa65654

time : 2019-09-07 19:27:01
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a95aaa6a6a9a5aa66a55aaa65654
codes : {154}ed715569a99a95aaa6a6a9a5aa66a55aaa65654

time : 2019-09-07 19:27:01
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a95aaa6a6a9a5aa66a55aaa65654
codes : {154}ed715569a99a95aaa6a6a9a5aa66a55aaa65654

time : 2019-09-07 19:27:01
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a95aaa6a6a9a5aa66a55aaa65654
codes : {154}ed715569a99a95aaa6a6a9a5aa66a55aaa65654

time : 2019-09-07 19:28:04
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553ccd4aacd32b54d2b4d2cb4aab554d2d4b54d3
codes : {160}553ccd4aacd32b54d2b4d2cb4aab554d2d4b54d3

time : 2019-09-07 19:28:52
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553caaab334d4d54cad4d2b2b534aab2d35334ab
codes : {160}553caaab334d4d54cad4d2b2b534aab2d35334ab

time : 2019-09-07 19:30:10
model : name count : 1 num_rows : 1 rows :
len : 88 data : 553cd354ab2cad2cd57116
codes : {88}553cd354ab2cad2cd57116

time : 2019-09-07 19:30:10
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a669565a56695a69966a55965699a95
codes : {160}555555565a669565a56695a69966a55965699a95

time : 2019-09-07 19:30:20
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:30:20
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:30:20
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:30:20
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:30:25
model : name count : 1 num_rows : 1 rows :

len : 52 data : 553cad2b33355
codes : {52}553cad2b33355

time : 2019-09-07 19:30:25
model : name count : 1 num_rows : 1 rows :
len : 52 data : 0cd306e69a5a5
codes : {52}0cd306e69a5a5

time : 2019-09-07 19:30:25
model : name count : 1 num_rows : 1 rows :
len : 57 data : 5aaaa695a56a598
codes : {57}5aaaa695a56a598

time : 2019-09-07 19:30:37
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa5665955665a96
codes : {160}555555565a6aa666595a5a6a6aa5665955665a96

time : 2019-09-07 19:30:37
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa5665955665a96
codes : {160}555555565a6aa666595a5a6a6aa5665955665a96

time : 2019-09-07 19:30:37
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa5665955665a96
codes : {160}555555565a6aa666595a5a6a6aa5665955665a96

time : 2019-09-07 19:30:37
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa5665955665a96
codes : {160}555555565a6aa666595a5a6a6aa5665955665a96

time : 2019-09-07 19:30:40
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa6665955665a99
codes : {160}555555565a6aa666595a5a6a6aa6665955665a99

time : 2019-09-07 19:30:40
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa6665955665a99
codes : {160}555555565a6aa666595a5a6a6aa6665955665a99

time : 2019-09-07 19:30:40
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa6665955665a99
codes : {160}555555565a6aa666595a5a6a6aa6665955665a99

time : 2019-09-07 19:30:41
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa6665955665a99
codes : {160}555555565a6aa666595a5a6a6aa6665955665a99

time : 2019-09-07 19:30:43
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa6665955665a99
codes : {160}555555565a6aa666595a5a6a6aa6665955665a99

time : 2019-09-07 19:30:44
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa6665955665a99
codes : {160}555555565a6aa666595a5a6a6aa6665955665a99

time : 2019-09-07 19:30:44
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa6665955665a99
codes : {160}555555565a6aa666595a5a6a6aa6665955665a99

time : 2019-09-07 19:30:44
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa666595a5a6a6aa6665955665a99
codes : {160}555555565a6aa666595a5a6a6aa6665955665a99

time : 2019-09-07 19:30:54
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd35532cd4b4b2b54d2b2b4b5554d2cacb2b3
codes : {160}553cd35532cd4b4b2b54d2b2b4b5554d2cacb2b3

time : 2019-09-07 19:30:54
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd35532cd4b4b2b54d2b2b4b5554d2cacb2b3
codes : {160}553cd35532cd4b4b2b54d2b2b4b5554d2cacb2b3

time : 2019-09-07 19:30:57
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd35532cd4acb4d4b2d4b4ad2aab52cb52cd3
codes : {160}553cd35532cd4acb4d4b2d4b4ad2aab52cb52cd3

time : 2019-09-07 19:30:58
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd35532cd4acb4d4b2d4b4ad2aab2d2000000
codes : {160}553cd35532cd4acb4d4b2d4b4ad2aab2d2000000

time : 2019-09-07 19:30:58
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd35532cd4acb4d4b2d4b4ad2aab2d34ad4ab
codes : {160}553cd35532cd4acb4d4b2d4b4ad2aab2d34ad4ab

time : 2019-09-07 19:30:58
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd35532cd4acb4d4b2d4b4ad2aab2d34ad4ab
codes : {160}553cd35532cd4acb4d4b2d4b4ad2aab2d34ad4ab

time : 2019-09-07 19:30:58
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd35532cd532ad52b2d4b4ad3554d2cb5552b
codes : {160}553cd35532cd532ad52b2d4b4ad3554d2cb5552b

time : 2019-09-07 19:30:59
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd35532cd532ad52b2d4b4ad3554d2cb5552b
codes : {160}553cd35532cd532ad52b2d4b4ad3554d2cb5552b

time : 2019-09-07 19:30:59
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd35532cd532ad52b2d4b4ad3554d2cb5552b
codes : {160}553cd35532cd532ad52b2d4b4ad3554d2cb5552b

time : 2019-09-07 19:31:03
model : name count : 1 num_rows : 1 rows :
len : 196 data : 55555556a66566a6695a569a5aa9a5559a5a665a5659aa597
codes : {196}55555556a66566a6695a569a5aa9a5559a5a665a5659aa597

time : 2019-09-07 19:31:03
model : name count : 1 num_rows : 1 rows :
len : 197 data : 55555556a66566a6695a569a659aa5559a5a66665695a59670
codes : {197}55555556a66566a6695a569a659aa5559a5a66665695a59670

time : 2019-09-07 19:31:03
model : name count : 1 num_rows : 1 rows :

len : 196 data : 55555556a66566a6695a569a659aa5559a5a66665695a5967
codes : {196}55555556a66566a6695a569a659aa5559a5a66665695a5967

time : 2019-09-07 19:31:03
model : name count : 1 num_rows : 1 rows :
len : 197 data : 55555556a66566a6695a569a5aa9a5559a5a665a5659aa5978
codes : {197}55555556a66566a6695a569a5aa9a5559a5a665a5659aa5978

time : 2019-09-07 19:31:03
model : name count : 1 num_rows : 1 rows :
len : 197 data : 55555556a66566a6695a569a659aa5559a5a66665695a59678
codes : {197}55555556a66566a6695a569a659aa5559a5a66665695a59678

time : 2019-09-07 19:31:03
model : name count : 1 num_rows : 1 rows :
len : 196 data : 55555556a66566a6695a569a5aa9a5559a5a665a5659aa597
codes : {196}55555556a66566a6695a569a5aa9a5559a5a665a5659aa597

time : 2019-09-07 19:31:03
model : name count : 1 num_rows : 1 rows :
len : 393 data :
55555556a66566a6695a569a659aa5559a5a66665695a596755555556a66566a6695a569a5aa9a5559a5a665a5659aa5970
codes :
{393}55555556a66566a6695a569a659aa5559a5a66665695a596755555556a66566a6695a569a5aa9a5559a5a665a5659aa5970

time : 2019-09-07 19:31:03
model : name count : 1 num_rows : 1 rows :
len : 197 data : 55555556a66566a6695a569a659aa5559a5a66665695a59670
codes : {197}55555556a66566a6695a569a659aa5559a5a66665695a59670

time : 2019-09-07 19:31:04
model : name count : 1 num_rows : 1 rows :
len : 197 data : 55555556a66566a6695a569a6559a5559a59665955aaa66a78
codes : {197}55555556a66566a6695a569a6559a5559a59665955aaa66a78

time : 2019-09-07 19:31:04
model : name count : 1 num_rows : 1 rows :
len : 197 data : 55555556a66566a6695a569a6559a5559a59665955aaa66a70
codes : {197}55555556a66566a6695a569a6559a5559a59665955aaa66a70

time : 2019-09-07 19:31:04
model : name count : 1 num_rows : 1 rows :
len : 197 data : 55555556a66566a6695a569a6559a5559a59665955aaa66a78

codes : {197}55555556a66566a6695a569a6559a5559a59665955aaa66a78

time : 2019-09-07 19:31:04

model : name count : 1 num_rows : 1 rows :

len : 197 data : 55555556a66566a6695a569a6559a5559a59665955aaa66a70

codes : {197}55555556a66566a6695a569a6559a5559a59665955aaa66a70

time : 2019-09-07 19:31:04

model : name count : 1 num_rows : 1 rows :

len : 197 data : 55555556a66566a6695a569a6559a5559a59665955aaa66a78

codes : {197}55555556a66566a6695a569a6559a5559a59665955aaa66a78

time : 2019-09-07 19:31:06

model : name count : 1 num_rows : 1 rows :

len : 196 data : 55555556a66566a6695a569a5aa6a5559a56666a565aa6567

codes : {196}55555556a66566a6695a569a5aa6a5559a56666a565aa6567

time : 2019-09-07 19:31:07

model : name count : 1 num_rows : 1 rows :

len : 196 data : 55555556a66566a6695a569a5aa6a5559a56666a565aa6567

codes : {196}55555556a66566a6695a569a5aa6a5559a56666a565aa6567

time : 2019-09-07 19:31:07

model : name count : 1 num_rows : 1 rows :

len : 186 data : 55555556a66566a6695a569a5aa6a5559a56666a565aa64

codes : {186}55555556a66566a6695a569a5aa6a5559a56666a565aa64

time : 2019-09-07 19:31:07

model : name count : 1 num_rows : 1 rows :

len : 196 data : 55555556a66566a6695a569a5aa6a5559a56666a565aa6567

codes : {196}55555556a66566a6695a569a5aa6a5559a56666a565aa6567

time : 2019-09-07 19:31:13

model : name count : 1 num_rows : 1 rows :

len : 163 data : 5d3cd3553ae6a522d352cb02d2b4addf68d2b2446

codes : {163}5d3cd3553ae6a522d352cb02d2b4addf68d2b2446

time : 2019-09-07 19:31:19

model : name count : 1 num_rows : 1 rows :

len : 128 data : 553ccc8acb4aed195b9e66682d132aac

codes : {128}553ccc8acb4aed195b9e66682d132aac

time : 2019-09-07 19:31:20

model : name count : 1 num_rows : 1 rows :
len : 158 data : 113cccb59790cd32b534ccd2b54caab2534ab2ac
codes : {158}113cccb59790cd32b534ccd2b54caab2534ab2ac

time : 2019-09-07 19:31:26
model : name count : 1 num_rows : 1 rows :
len : 159 data : 553cccad4aad955955a9a69a9556aa9a56a69596
codes : {159}553cccad4aad955955a9a69a9556aa9a56a69596

time : 2019-09-07 19:31:51
model : name count : 1 num_rows : 1 rows :
len : 161 data : 555555565a6aa6665a5a6a996aa9669652b34b330
codes : {161}555555565a6aa6665a5a6a996aa9669652b34b330

time : 2019-09-07 19:31:51
model : name count : 1 num_rows : 1 rows :
len : 162 data : 555555565a6aa6665a5a6a996aa9669655634b318
codes : {162}555555565a6aa6665a5a6a996aa9669655634b318

time : 2019-09-07 19:31:51
model : name count : 1 num_rows : 1 rows :
len : 161 data : 555555565a6aa6665a59354cb554b34baab34b330
codes : {161}555555565a6aa6665a59354cb554b34baab34b330

time : 2019-09-07 19:31:51
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa6665a5a6a996aa9669655669666
codes : {160}555555565a6aa6665a5a6a996aa9669655669666

time : 2019-09-07 19:31:54
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:31:55
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:31:55
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:31:55
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:31:57
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa6665a5a6a996aa9669655669666
codes : {160}555555565a6aa6665a5a6a996aa9669655669666

time : 2019-09-07 19:31:57
model : name count : 1 num_rows : 1 rows :
len : 157 data : 555555565a6aa6665a5a6a996aa9669655669660
codes : {157}555555565a6aa6665a5a6a996aa9669655669660

time : 2019-09-07 19:31:57
model : name count : 1 num_rows : 1 rows :
len : 162 data : 5555552b2d3553332d2d354cb55459a59559a5998
codes : {162}5555552b2d3553332d2d354cb55459a59559a5998

time : 2019-09-07 19:31:57
model : name count : 1 num_rows : 1 rows :
len : 161 data : 555555565a6aa6665a5a6a996aa96696556696660
codes : {161}555555565a6aa6665a5a6a996aa96696556696660

time : 2019-09-07 19:33:49
model : name count : 1 num_rows : 1 rows :
len : 163 data : 555555465a6aa6632d4cca669aaa599e55598aad2
codes : {163}555555465a6aa6632d4cca669aaa599e55598aad2

time : 2019-09-07 19:33:49
model : name count : 1 num_rows : 1 rows :
len : 161 data : 555555565a6aa6665a99a99a6aa9662caab32ab48
codes : {161}555555565a6aa6665a99a99a6aa9662caab32ab48

time : 2019-09-07 19:33:49
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa6665a99a99a6aa9665955665569
codes : {160}555555565a6aa6665a99a99a6aa9665955665569

time : 2019-09-07 19:33:49
model : name count : 1 num_rows : 1 rows :

len : 161 data : 555555565a6aa6665a99a99a6aa96659d4b32ab48
codes : {161}555555565a6aa6665a99a99a6aa96659d4b32ab48

time : 2019-09-07 19:33:51
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:33:51
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:33:51
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:33:51
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654
codes : {154}ed715569a99a6aaaa6a6a9a5aa66a55aaaa6654

time : 2019-09-07 19:33:52
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa6665a99a9da6aaa66595566556a
codes : {160}555555565a6aa6665a99a9da6aaa66595566556a

time : 2019-09-07 19:33:52
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa6665a99a99a6aaa66595566556a
codes : {160}555555565a6aa6665a99a99a6aaa66595566556a

time : 2019-09-07 19:33:52
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa6665a99a99a6aaa66595566556a
codes : {160}555555565a6aa6665a99a99a6aaa66595566556a

time : 2019-09-07 19:33:52
model : name count : 1 num_rows : 1 rows :
len : 161 data : 555552ab2d3553332d4cd4cd3555332caab32ab50
codes : {161}555552ab2d3553332d4cd4cd3555332caab32ab50

time : 2019-09-07 19:33:55
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa6665a99a99a6aaa66595566556a
codes : {160}555555565a6aa6665a99a99a6aaa66595566556a

time : 2019-09-07 19:33:55
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa6665a99a99a6eaa66595566556a
codes : {160}555555565a6aa6665a99a99a6eaa66595566556a

time : 2019-09-07 19:33:55
model : name count : 1 num_rows : 1 rows :
len : 160 data : 555555565a6aa6665a99a99a6aaa66595566556a
codes : {160}555555565a6aa6665a99a99a6aaa66595566556a

time : 2019-09-07 19:33:55
model : name count : 1 num_rows : 1 rows :
len : 161 data : 555555565a6aa6332d4cd4cd3555332caab32ab50
codes : {161}555555565a6aa6332d4cd4cd3555332caab32ab50

time : 2019-09-07 19:34:01
model : name count : 1 num_rows : 1 rows :
len : 162 data : 553cd2b4e2b2b2d54aa32cacbd0d2a0342cab30cc
codes : {162}553cd2b4e2b2b2d54aa32cacbd0d2a0342cab30cc

time : 2019-09-07 19:34:02
model : name count : 1 num_rows : 1 rows :
len : 160 data : 013cd2b4aab2b2d54aab2cacb52d554d2b2accb3
codes : {160}013cd2b4aab2b2d54aab2cacb52d554d2b2accb3

time : 2019-09-07 19:34:02
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd2b4aab2b2d54aab2cacb52d554d2b3accb3
codes : {160}553cd2b4aab2b2d54aab2cacb52d554d2b3accb3

time : 2019-09-07 19:34:05
model : name count : 1 num_rows : 1 rows :
len : 161 data : 553cd2b6aab2b2b334b32cab4acfd1cd2bb52d100
codes : {161}553cd2b6aab2b2b334b32cab4acfd1cd2bb52d100

time : 2019-09-07 19:34:05
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd2b4aab2b2b334b32cab4acb554d2b352d33
codes : {160}553cd2b4aab2b2b334b32cab4acb554d2b352d33

time : 2019-09-07 19:34:05
model : name count : 1 num_rows : 1 rows :
len : 159 data : 80e010a75cc8caccd2ccb2ad2b2d5534ac6a5a66
codes : {159}80e010a75cc8caccd2ccb2ad2b2d5534ac6a5a66

time : 2019-09-07 19:34:07
model : name count : 1 num_rows : 1 rows :
len : 160 data : 553cd2b4aab2b2cb4d532cb2b52aaab52b534b2b
codes : {160}553cd2b4aab2b2cb4d532cb2b52aaab52b534b2b

time : 2019-09-07 19:34:07
model : name count : 1 num_rows : 1 rows :
len : 163 data : 000000000000b225b6a8830c878ebaacb72b3ce26
codes : {163}000000000000b225b6a8830c878ebaacb72b3ce26

time : 2019-09-07 19:34:07
model : name count : 1 num_rows : 1 rows :
len : 164 data : 000000592ea67f0c84453bff3b92baa30f4ecbb7b
codes : {164}000000592ea67f0c84453bff3b92baa30f4ecbb7b

time : 2019-09-07 19:34:12
model : name count : 1 num_rows : 1 rows :
len : 123 data : 6f73ffff6f06f9ff6dfee9bd3fed7e
codes : {123}6f73ffff6f06f9ff6dfee9bd3fed7e

time : 2019-09-07 19:34:12
model : name count : 1 num_rows : 1 rows :
len : 205 data : dffffd7f1ff31fa5fffeffffe000000000200000800314080040
codes : {205}dffffd7f1ff31fa5fffeffffe000000000200000800314080040

time : 2019-09-07 19:35:07
model : name count : 1 num_rows : 1 rows :
len : 154 data : 00015566aa9a6aaaa5a996565a56965a9955654
codes : {154}00015566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:35:07
model : name count : 1 num_rows : 1 rows :
len : 154 data : 00015566aa9a6aaaa5a996565a56965a9955654
codes : {154}00015566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:35:07
model : name count : 1 num_rows : 1 rows :

len : 154 data : 00005566aa9a6aaaa5a996565a56965a9955654
codes : {154}00005566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:35:07
model : name count : 1 num_rows : 1 rows :
len : 154 data : 0d715566aa9a6aaaa5a996565a56965a9955654
codes : {154}0d715566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:35:07
model : name count : 1 num_rows : 1 rows :
len : 154 data : 0d715566aa9a6aaaa5a996565a56965a9955654
codes : {154}0d715566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:35:07
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed715566aa9a6aaaa5a996565a56965a9955654
codes : {154}ed715566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:35:07
model : name count : 1 num_rows : 1 rows :
len : 154 data : 0d715566aa9a6aaaa5a996565a56965a9955654
codes : {154}0d715566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:35:07
model : name count : 1 num_rows : 1 rows :
len : 154 data : 01715566aa9a6aaaa5a996565a56965a9955654
codes : {154}01715566aa9a6aaaa5a996565a56965a9955654

time : 2019-09-07 19:35:20
model : name count : 1 num_rows : 1 rows :
len : 154 data : 01715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}01715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:35:21
model : name count : 1 num_rows : 1 rows :
len : 154 data : 01715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}01715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:35:21
model : name count : 1 num_rows : 1 rows :
len : 154 data : 05715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}05715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:35:21
model : name count : 1 num_rows : 1 rows :
len : 153 data : 02e2aad2b3352b554b532b5335552ab5334d348
codes : {153}02e2aad2b3352b554b532b5335552ab5334d348

time : 2019-09-07 19:35:21
model : name count : 1 num_rows : 1 rows :
len : 154 data : 00715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}00715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:35:21
model : name count : 1 num_rows : 1 rows :
len : 154 data : 01715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}01715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:35:21
model : name count : 1 num_rows : 1 rows :
len : 154 data : 05715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}05715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:35:21
model : name count : 1 num_rows : 1 rows :
len : 154 data : 00715569599a95aaa5a995a99aaa955a99a69a4
codes : {154}00715569599a95aaa5a995a99aaa955a99a69a4

time : 2019-09-07 19:35:24
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:35:24
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

time : 2019-09-07 19:35:24
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66194
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66194

time : 2019-09-07 19:35:24
model : name count : 1 num_rows : 1 rows :
len : 154 data : ed7155696a9a6aaaa6a6a696aa69955aaa66594
codes : {154}ed7155696a9a6aaaa6a6a696aa69955aaa66594

CSignal caught, exiting!

34 = 0.4 psi, 4c=0.1 psi

77 = d3 2b

78 = d2 d3

80 = d2 cb

82 = d2 b3

86 = cd 53

87 = cd 4b

89 = cd 33

00 ?? ?? ?? 55 PP TT TT 55 55 ID ID ID ID ID ID d5 BT CR CR 0

00 6b 8a ad 55 34 d2 d3 55 55 4b 35 32 cd 2b 4a d5 4b 4c ac 0 0.4 PSI 78 Deg F

00 6b 8a ad 55 34 d3 2b 55 55 4b 35 32 cd 2b 4a d5 4c d3 54 0 0.4PSI 77 Deg F

00 6b 8a ad 55 4c d3 2b 55 55 4b 35 32 cd 2b 4a d5 4d 32 b4 0 0.1PSI 77 Deg F

00 6b 8a ad 55 4c d2 b3 55 55 4b 35 32 cd 2b 4a d5 4b 35 2c 0 0.1PSI 82 Deg F

00 6b 8a ad 55 34 cd 53 55 55 4b 35 32 cd 2b 4a d5 4a b5 34 0 0.4 PSI 86 Deg F

00 6b 8a ad 55 34 d3 2b 55 55 4b 35 32 cd 2b 4a d5 2c d4 b4 0 0.4PSI 77 Deg F BAT LOW

00 6b 8a ad 55 4c d2 d3 55 55 4b 35 32 cd 2b 4a d5 52 ac b4 0 Not Triggered

00 6b 8a ad 55 4c d2 d3 55 55 4b 35 32 cd 2b 4a d5 52 ac b4 0 Not Triggered

00 6b 8a ad 55 4c d2 d3 55 55 4b 35 33 34 ca aa d5 4c b2 d4 0 0.1PSI 78 Deg F A5F

00 6b 8a ad 55 34 d2 d3 55 55 4b 35 33 34 ca aa d5 4d 53 34 0 0.4PSI 78 Deg F A5F

00 6b 8a ad 55 34 cd 4b 55 55 4b 35 33 34 ca aa d5 4c cc b4 0 0.4PSI 87 Deg F A5F

00 6b 8a ad 55 34 cd 33 55 55 4b 35 33 34 ca aa d5 4d 32 cc 0 0.4PSI 89 Deg F A5F

00 6b 8a ad 55 34 d2 cb 55 55 4b 35 33 34 ca aa d5 4d 35 2c 0 0.4PSI 80 Deg F A5F

00 6b 8a ad 55 34 d2 cb 55 55 4b 35 33 34 ca aa d5 2d 32 cc 0 0.4PSI 80 Deg F A5F BAT LOW

00 da e2 ab 55 53 34 cd 55 4b 53 2b 53 35 55 2a ad 52 b2 b5 Mx-sensor FL clone Trig

00 da e2 ab 55 53 34 cd 55 4b 53 2b 53 35 55 2a ad 52 b2 b5

00 da e2 ab 55 53 34 cd 55 4b 53 2c ac b4 ad 2c ad 52 cd 53 MX-sensor RL clone Trig

00 ?? ?? pp pp pp TT TT aa ID ID ID ID ID ID ID ID BT CR CR 0

ed715569699a66aaa6a6a696aa69955aa9a6954

00 d7 15 5a aa 69 a5 a6 aa aa 96 6a 65 9a 56 95 aa 96 99 58 801A2D39 0.4 psi 78 F OK Trig

00 d7 15 5a aa 69 a6 56 aa aa 96 6a 65 9a 56 95 aa 99 a6 a8 801A2D39 0.4PSI 77 F OK Trig

00 d7 15 5a aa 99 a6 56 aa aa 96 6a 65 9a 56 95 aa 9a 65 68 801A2D39 0.1PSI 77 F OK Trig

00 d7 15 5a aa 99 a5 66 aa aa 96 6a 65 9a 56 95 aa 96 6a 58 801A2D39 0.1PSI 82 F OK Trig

00 d7 15 5a aa 69 9a a6 aa aa 96 6a 65 9a 56 95 aa 95 6a 68 801A2D39 0.4 PSI 86 F OK Trig

00 d7 15 5a aa 69 a6 56 aa aa 96 6a 65 9a 56 95 aa 59 a9 68 801A2D39 0.4PSI 77 F LOW Trig

00 d7 15 5a aa 99 a6 66 aa aa 96 6a 66 69 95 55 aa 56 99 a8 801A2A5F 1kPa 23.9C LOW Trig

00 d7 15 5a aa 99 a6 66 aa aa 96 6a 66 69 95 55 aa 66 9a 58 801A2A5F 1kPa 23.9C LOW Not Trig

00 d7 15 5a aa 99 a5 a6 aa aa 96 6a 65 9a 56 95 aa a5 59 68 Not Triggered

00 d7 15 5a aa 99 a5 a6 aa aa 96 6a 65 9a 56 95 aa a5 59 68 Not Triggered

00 d7 15 5a aa 99 a5 a6 aa aa 96 6a 66 69 95 55 aa 99 65 a8 801A2A5F 0.1PSI 78 F OK Trig

00 d7 15 5a aa 69 a5 a6 aa aa 96 6a 66 69 95 55 aa 9a a6 68 801A2A5F 0.4PSI 78 F OK Trig

00 d7 15 5a aa 69 9a 96 aa aa 96 6a 66 69 95 55 aa 99 99 68 801A2A5F 0.4PSI 87 F OK Trig

00 d7 15 5a aa 69 9a 66 aa aa 96 6a 66 69 95 55 aa 9a 65 98 801A2A5F 0.4PSI 89 F OK Trig

```

00 d7 15 5a aa 69 a5 96 aa aa 96 6a 66 69 95 55 aa 9a 6a 58 801A2A5F 0.4PSI 80 F OK Trig
xE d7 15 56 95 59 a6 9a aa 5a 99 5a 99 aa a9 55 a9 9a 69 a4 03171407 31.8 psi 73 F OK Trig FL
xE d7 15 56 6a a9 a6 9a aa 5a 99 5a 99 aa a9 55 a9 96 65 54 03171407 31.9 psi 73 F OK Trig FL
0x 17 15 56 6a 99 a6 aa aa 5a 99 65 65 a5 69 65 a9 9a 69 a4 0316ECE6 32.1 psi 71 F OK Trig RL
xE d7 15 56 9a 59 a6 aa aa 6a 6a 9a 5a a6 6a 55 aa 96 99 94 022130A3 29.3 psi 71 F OK Trig RR
xE d7 15 56 96 99 a6 6a aa 6a 6a 69 6a a6 99 55 aa 9a 69 54 02226097 30.5 psi 75 F OK Trig FR
xE d7 15 56 9a 59 a6 aa aa 6a 6a 9a 5a a6 6a 55 aa a6 9a 64 Raw capture
01 b5 c5 56 aa a6 69 9a aa 96 a6 56 a6 6a aa 55 5a a5 65 6a

```

```

024B 801A2D39 C3 46          801A2D39 0.4PSI 77 F LOW Trig
014A 801A2A5F C2 93          801A2A5F 1kPa 23.9C LOW Not Trig

```

OLD	801A2A5F	2149198431	<u>aa 96 6a 66 69 95 55</u>	aa966a66699555
OLD	801A2D39	2149199161	<u>aa 96 6a 65 9a 56 95</u>	aa966a659a5695
FR	02226097	35807383	<u>6a 6a 69 6a a6 99 55</u>	6a6a696aa69955
RR	022130A3	35729571	<u>6a 6a 9a 5a a6 6a 55</u>	6a6a9a5aa66a55
FL	03171407	51844103	<u>5a 99 5a 99 aa a9 55</u>	5a995a99aaa955
RL	0316ECE6	51834086	<u>5a 99 65 65 a5 69 65</u>	5a996565a56965

0.1 psi	<u>5a aa 99</u>	<u>0 kPa</u>
0.4 psi	<u>5a aa 69</u>	<u>1k kPa</u>
29.3 psi	<u>56 9a 59</u>	<u>202 kPa</u>
30.5 psi	<u>56 96 99</u>	
31.8 psi	<u>56 95 59</u>	
31.9 psi	<u>56 6a a9</u>	
32.1 psi	<u>56 6a 99</u>	

```

71F 21.6C a6 aa
73F 22.7C a6 9a
75F      a6 6a
      23.9C a6 66
77F 25C   a6 56
78F 25.5C a5 a6
80F 26.6C a5 96
82F 27.7C a5 66
86F 30C   9a a6
87F 30.5C 9a 96
89F 31.6C 9a 66

```

Old TPMS wheel sensors(022130A3 & 02226097) transmitting spontaneously every 3:30 mins while parked

New TPMS wheel sensors (0316ECE6 & 03171407) transmit only when triggered - probably still in storage mode

So far, all decoding has been done as FSK_PCM where as data is being encoded by this TPMS sensor as FSK Manchester code (Going high to low = 1, low to High is 0). Need to figure out how to decode FSK_Manchester

111110000000101001001100000000001101000101010010010010101110110101001
11111000000010100100110000001110110111010101001000000111110000101101
1 1111 0000 0001 0100 1001 1000 0001 1101 1011 1010 1010 0100 0000 0111 1100 0010 1101

11111000100010110100110000001110110111010101001000, 0000111110000101101
111110001000101001001100000000001101000101010010101011100000111100001

111110001000101101000100000011101101110101010010000000111110000101101

10101010110101010101010011001101001101001011010101010101010100101100110101001100110011010011001010
10101010110101010100101010110101010011

1111E000000EEEE0EE0E1E000000000E1EEE00EEEEEE0EEE111111E0000E111E000EE
111100000000100000000010001111110000111000

011110100001101001001100000000101101000100010010111111100000111100001

0000011111110101101100111111111100101110101011010000100101110000111101

0000 0111 1111 0101 1011 0011 1111 1111 0010 1110 1010 1101 0000 1001 0111 0000 1111 01

00001111111100001001001111111111100010101011011111111000101000011111

0000 1111 1111 0000 10010011111111111000101010110111111111000101000011111

0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 0, 1, 1, 0, 0, 1, 1, 0, 1, 0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0,
1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 0, 1, 1, 0, 1, 0, 0, 1, 1, 0, 0, 1, 1, 0, 0, 1, 1, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1,
0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 0, 1, 1, 0,

010101010110101010101010011001101001101001011010101010101010101010010110011010100110011001101001100101
0101010101101010101001010101101010100110

0000011111110101101100111111111100101110101011010000000111110000111101
0000 0111 1111 0101 1011 0011 1111 1111 0010 1110 1010 1101 0000 0001 1111 0000 1111 01

1010101010010101010101011001100101100101101001010101010101010101101001100101011001100110010110011010
1010101010010101010110101010010101011001E

1111100000001010010011000000000011010001010100101111111000001111000010

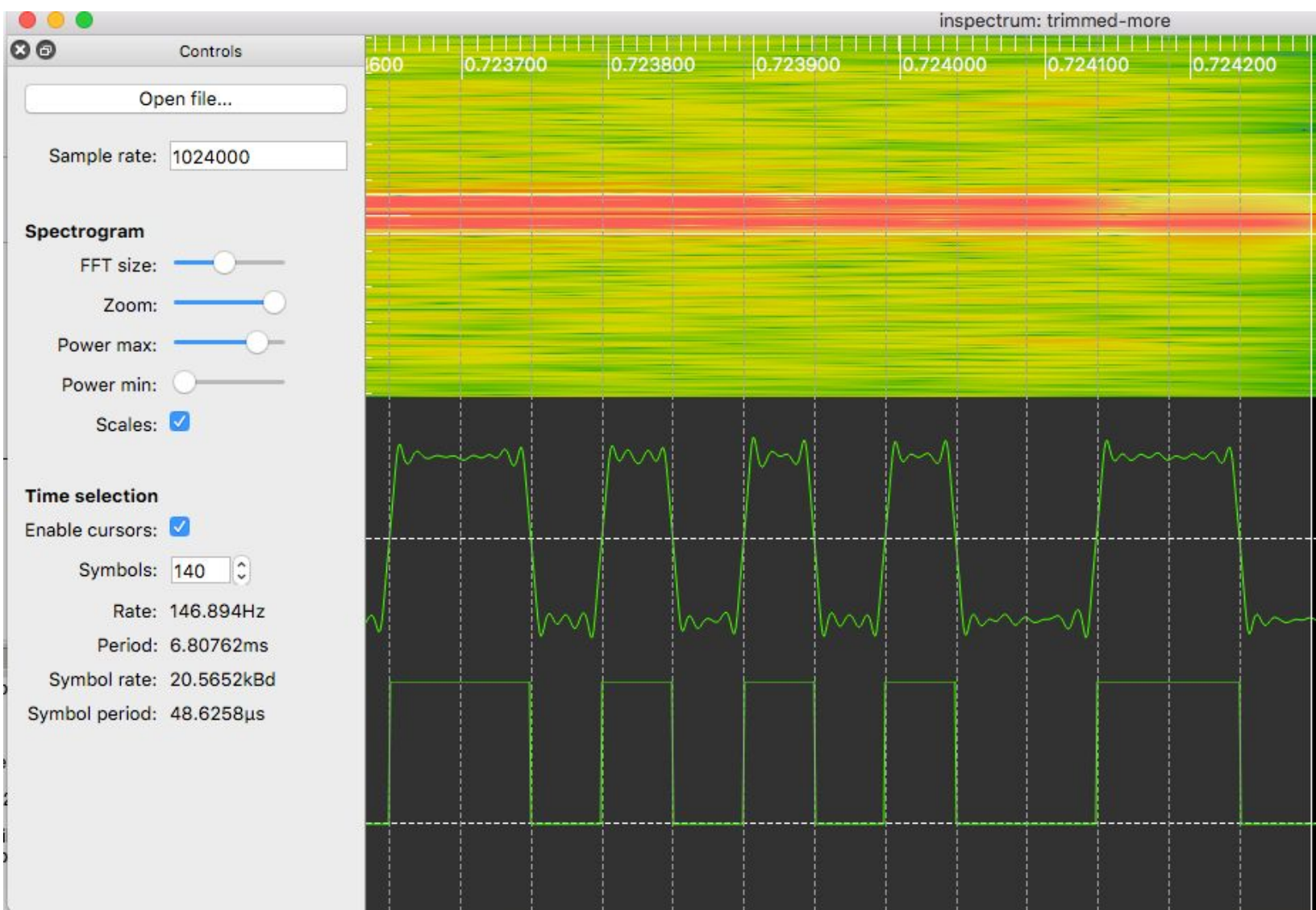
1111 1000 0000 1010 0100 1100 0000 0000 1101 0001 0101 0010 1111 1110 0000 1111 0000 10

0000011111110101101100111111111100101110101011010000000111110000111101
0000 0111 1111 0101 1011 0011 1111 1111 0010 1110 1010 1101 0000 0001 1111 0000 1111 01 Visually verified to be
correct decode (GE Thomas)

111111000000101001001100000000011010001010100101111110000011111000010 (IEEE 802)

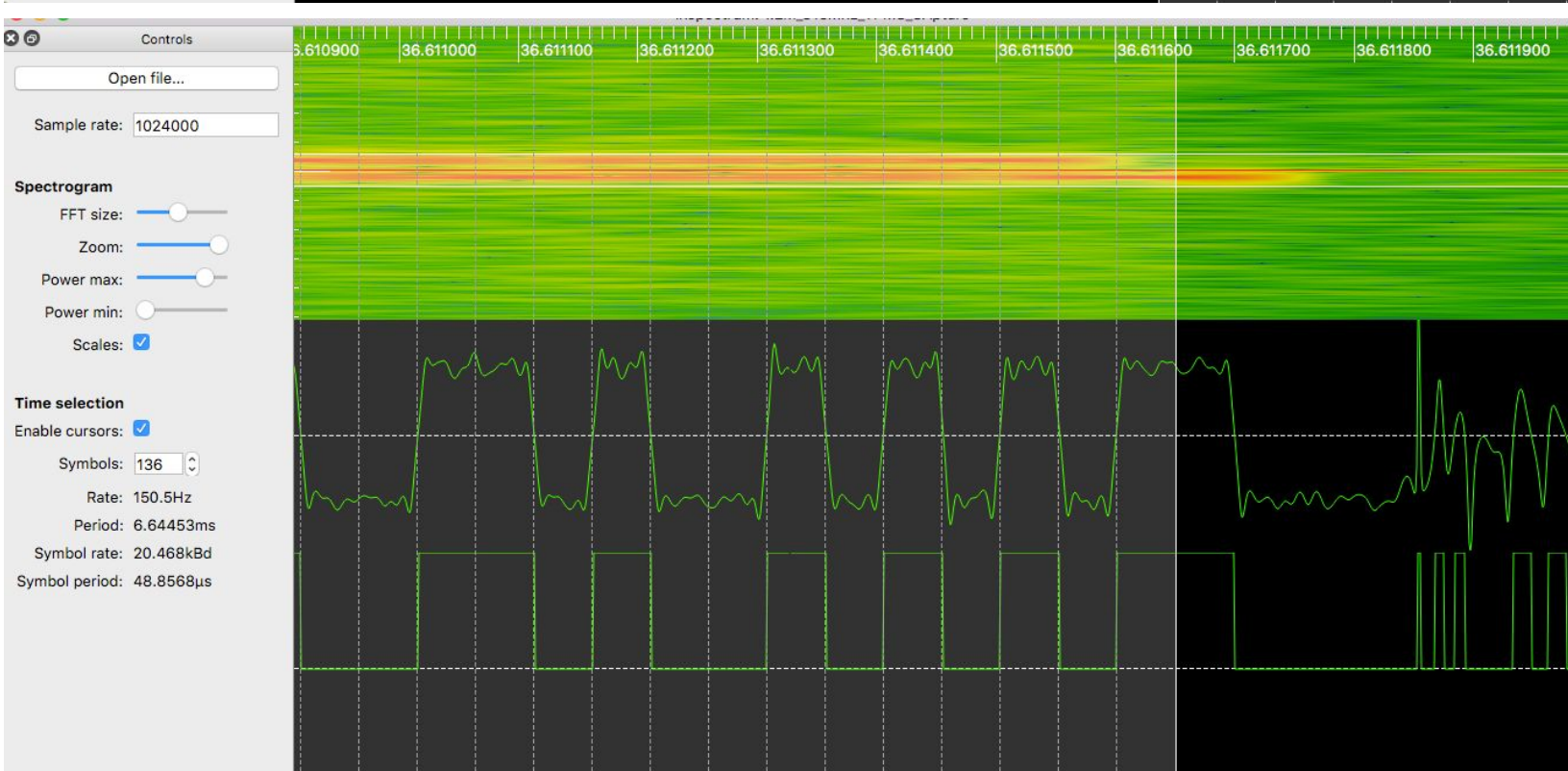
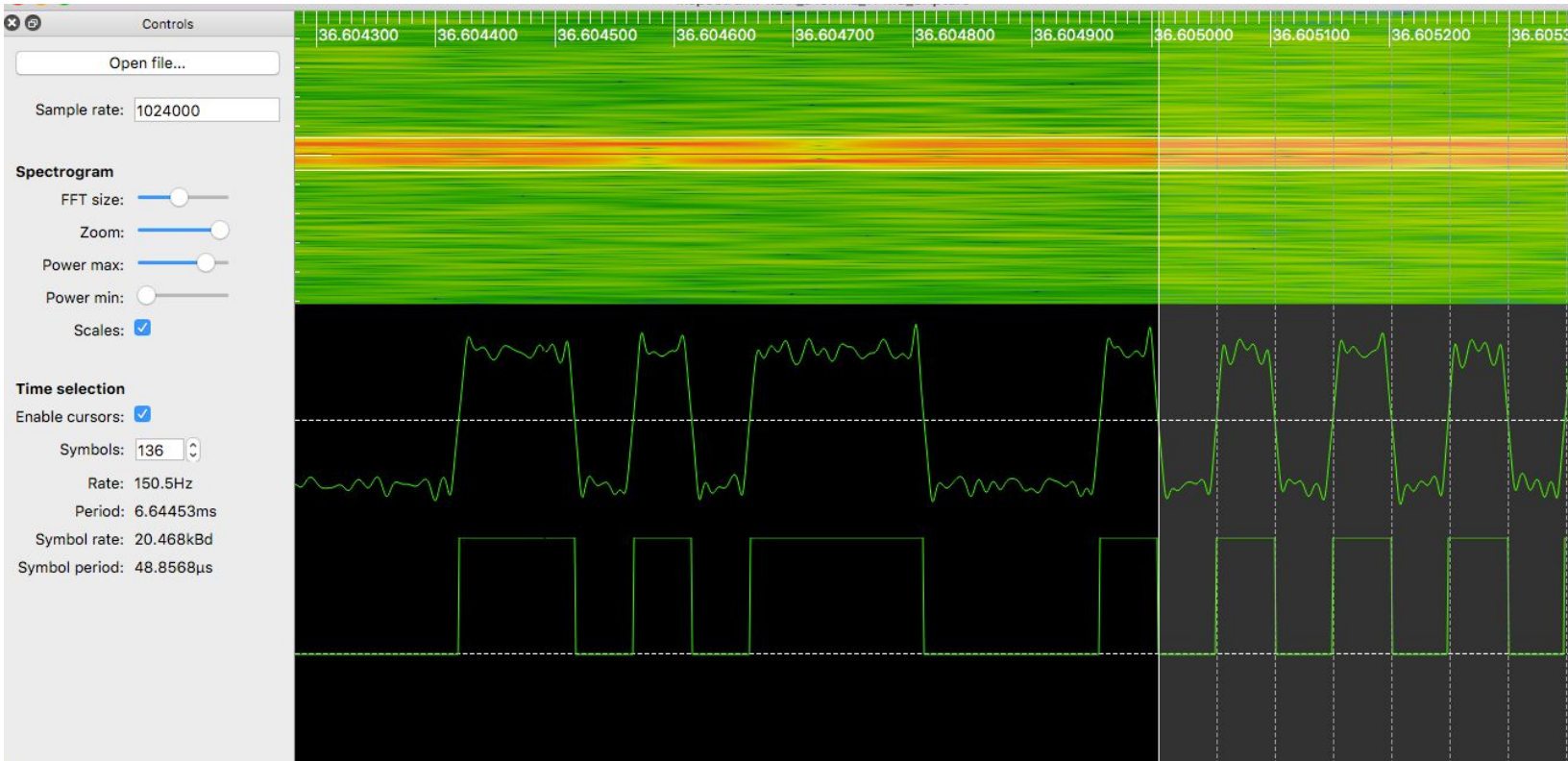
11111100000 0010 1001 0011 0000 0000 0011 0100 0101 0100 1011 1111 1000 0011 1100 0010

<https://eleif.net/manchester.html>



136 symbols from inspectrum using above strategy

Basically - Match the 15 bit preamble () and then take 128 bits following preamble and discard the rest of the remaining bits



01010101101010101010011010011010011001010110101010101010101001011001101010011001011001101001010110
100101011010101010101001101001010101

Manchester decode

11110000001001001011100000000001101000101101001110011100000001001111

F024B801A2D39C04F

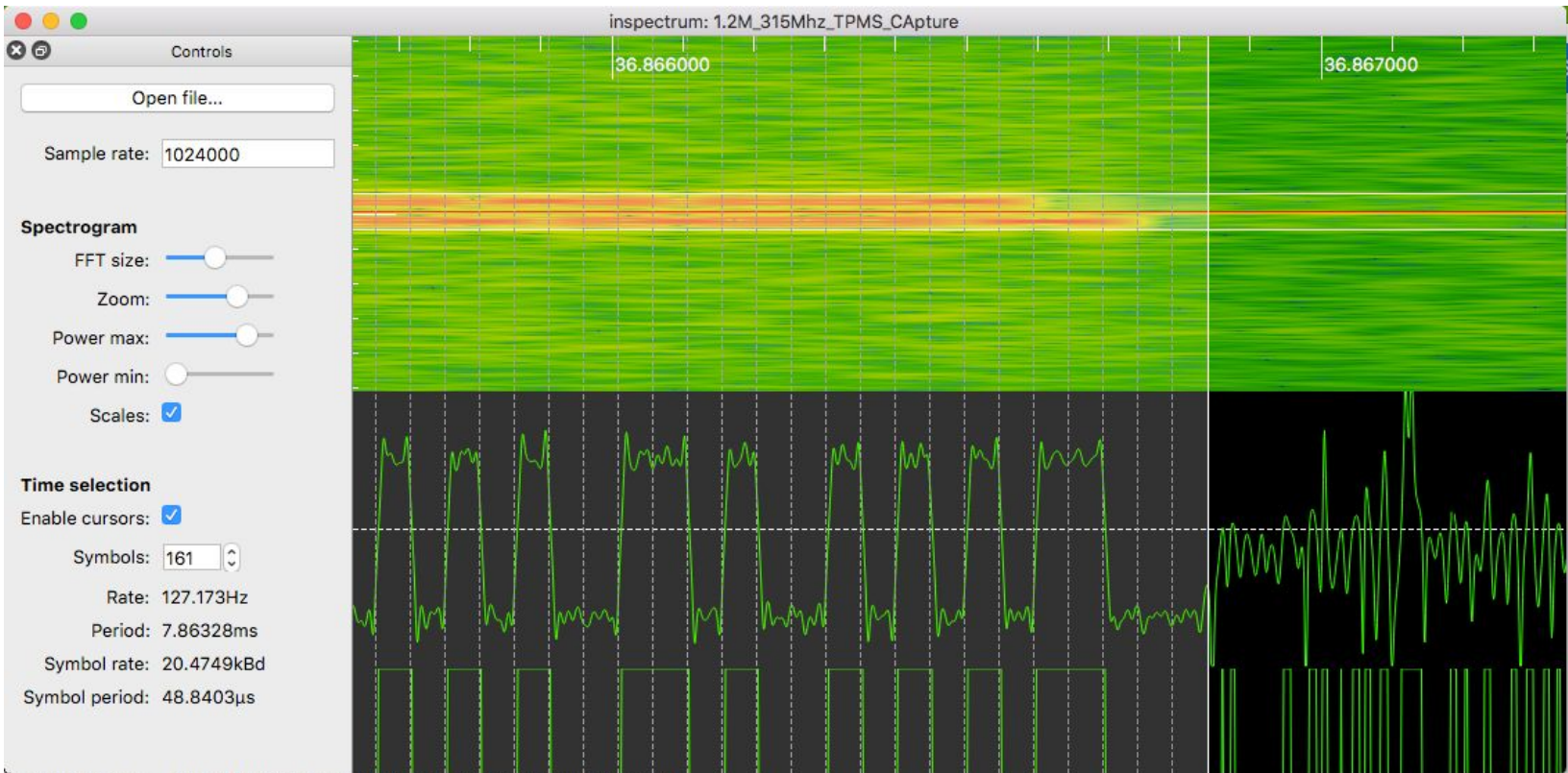
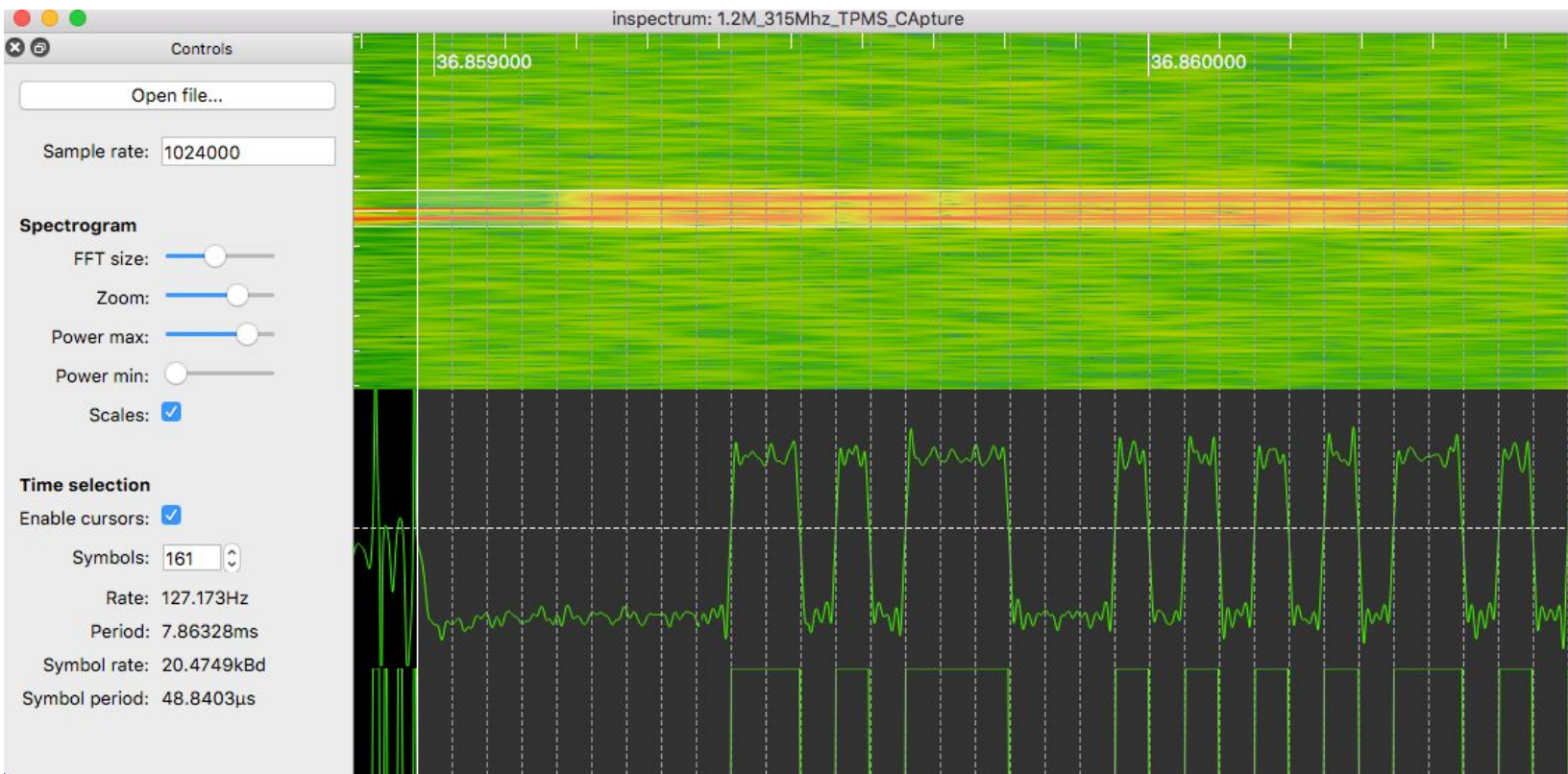
024B 801A 2D39 C04F

01010101101010101010011010011010011001010110101010101010101001011001101010011001011001101001010110
100101011010101010101001101001010101
10101010110101010101010011001101001011010011010101010101010100101100110101001100101100110100101011
010010101101010101010010101011001011

Capture from rtl_433 =

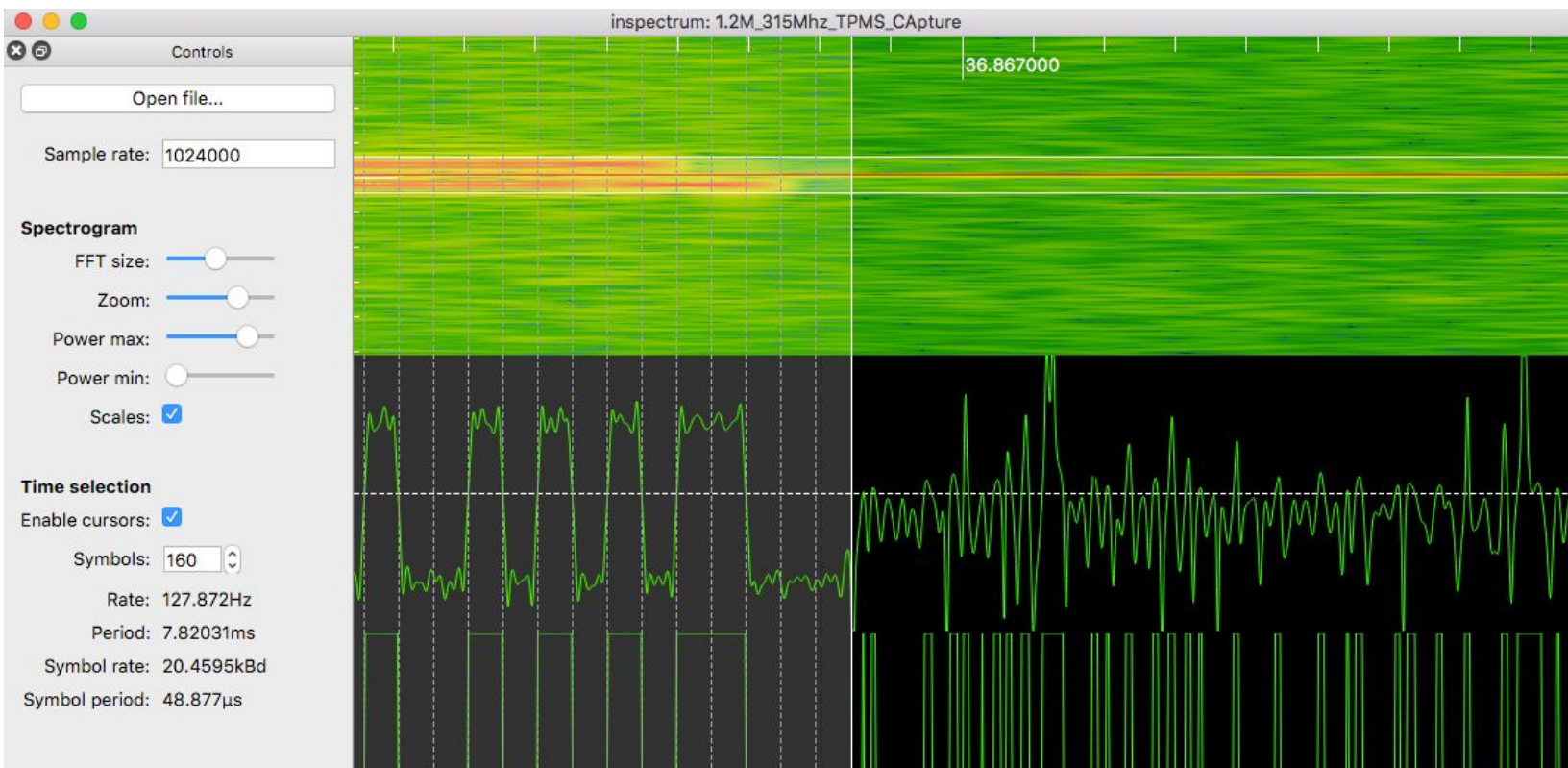
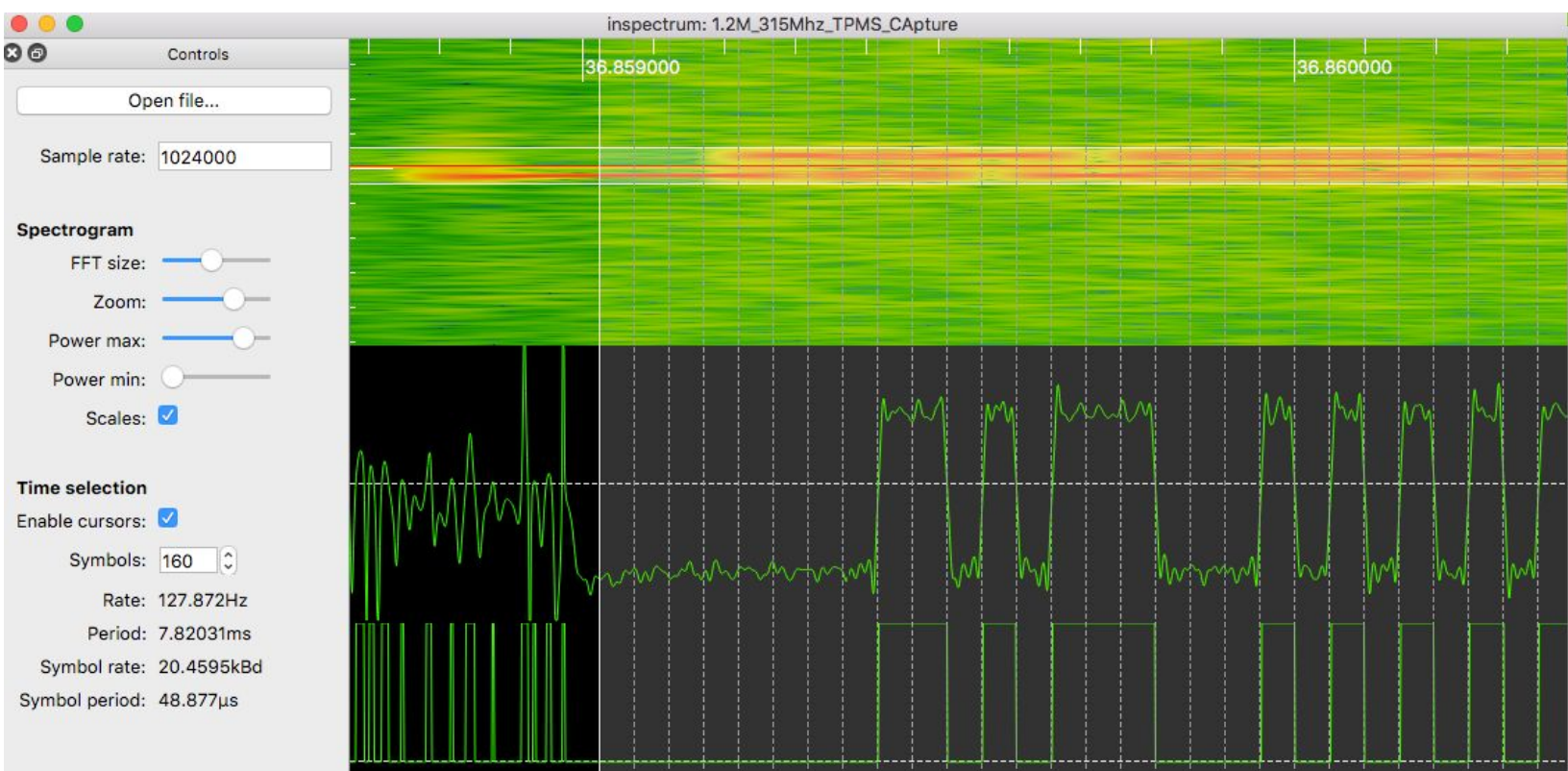
{161}006b8aad5534d32b55554b3532cd2b4ad554d2ac0

{160}00d7155aaa69a656aaaa966a659a5695aaa9a558



000000001101011100010101010110101010100110100110100110010101101010101010101001011001101010011
00101100110100101011010010101101010101010011010010101011000 (161 bits)

Binary to Hex = D7155AAA69A656AAAA966A659A5695AAA9A558

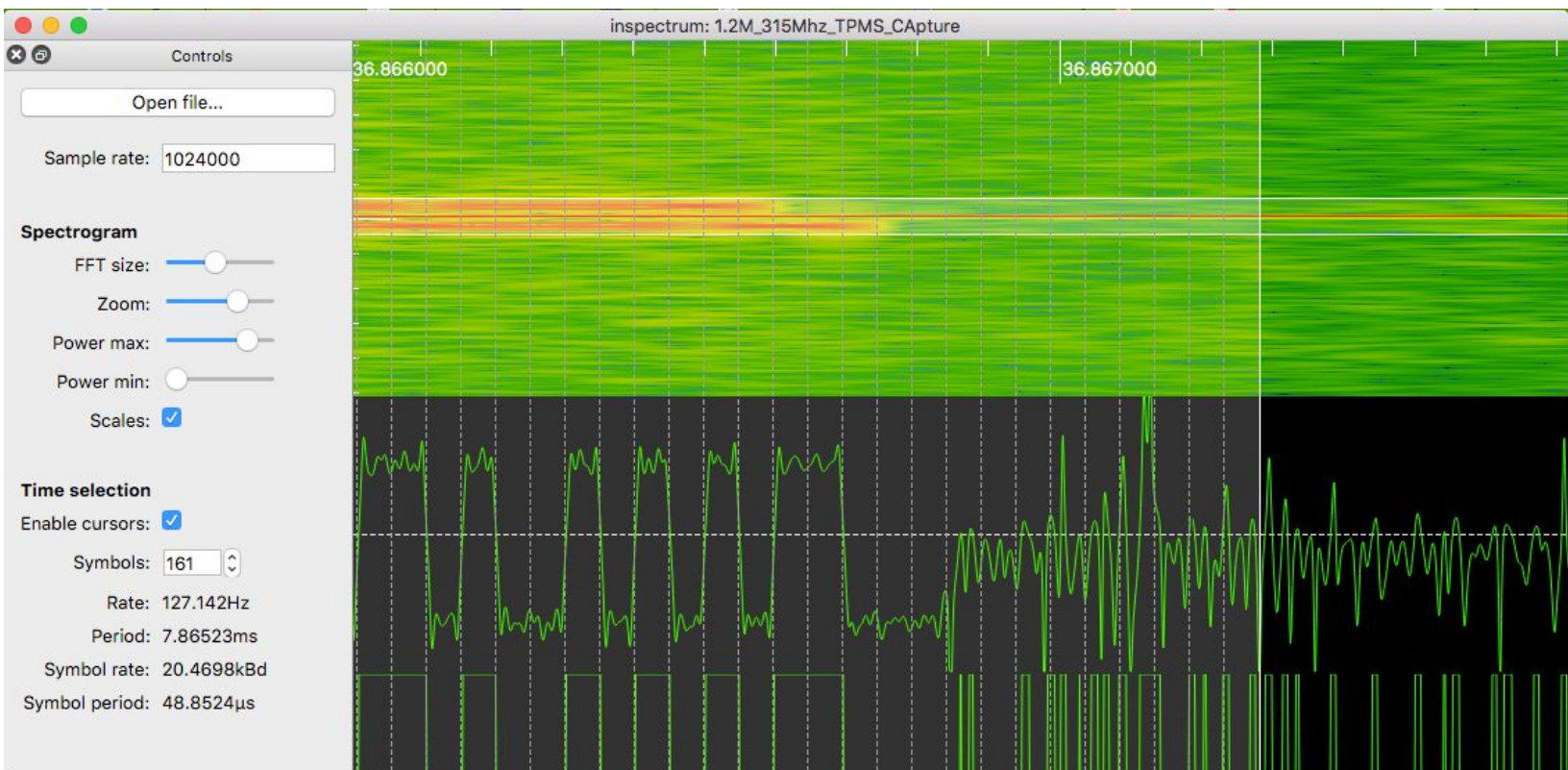
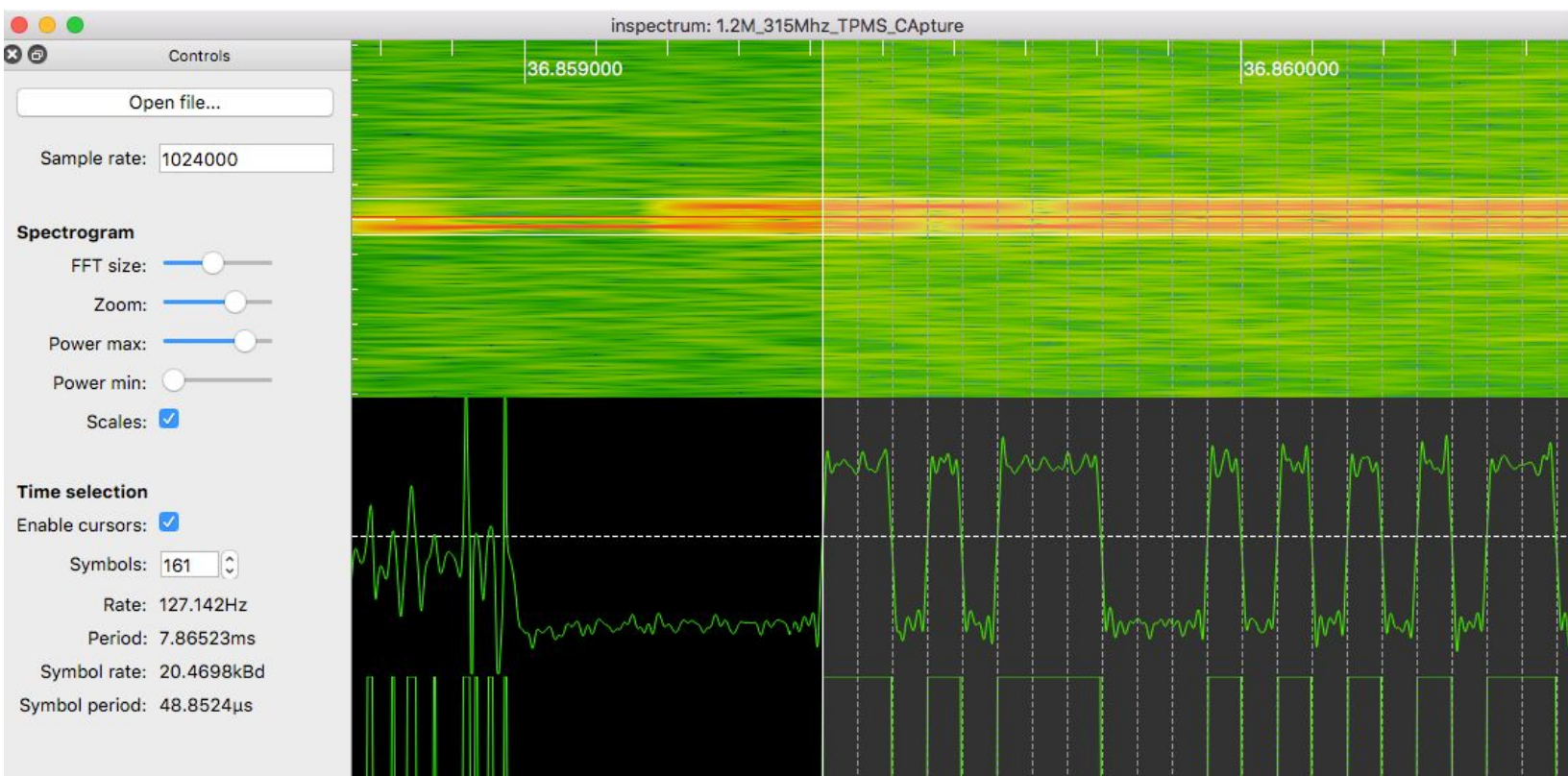


0000000011010111000101010101101010101001101001101001100101011010101010101010010110011010100110
0101100110100101011010010101101010101010011010010101011000(160 bits)

Binary to Hex = D7155AAA69A656AAAA966A659A5695AAA9A558

{161}006b8aad5534d32b55554b3532cd2b4ad554d2ac0 Hex to Binary

1101011100010101010110101010101001101001101001100101011010101010101010101001011001101010011001011001
10100101011010010101101010101010011010010101011000000 (155 bits)



1101011100010101010110101010101001101001101001100101011010101010101010101001011001101010011001011001
10100101011010010101101010101010011010010101011000000000000 (161 bits)

Remove 6 trailing 0s=

1101011100010101010110101010100110100110100110010101101010101010101001011001101010011001011001
10100101011010010101101010101010011010010101011000000 (155 bits)

Binary to Hex

6B8AAD5534D32B55554B3532CD2B4AD554D2AC0

Back process - rtl_433 data to manchester decode

{160}00d7155aaa69a656aaaa966a659a5695aaa9a558

Hex to Binary =

1101011100010101010110101010100110100110100110010101101010101010101001011001101010011001011001
10100101011010010101101010101010011010010101011000 (152 bits)

110101110001(12bits)

0101010110101010101001101001101001100101011010101010101010101001011001101010011001011001101001010110
100101011010101010101001101001010101 (136 bits)

1000 (4 bits)

Manchester decode 136 bits

11110000001001001011100000000001101000101101001110011100000001001111

Binary to Hex

F024B801A2D39C04F

Data decoded from inspectrum

00000000110101110001010101011010101010011010011010011001010110101010101010101010010110011010100110
0101100110100101011010010101101010101010011010010101011000(160 bits)

Blnary to Hex = D7155AAA69A656AAAA966A659A5695AAA9A558

00000000110101110001 (20 bits)

0101010110101010101001101001101001100101011010101010101010101001011001101010011001011001101001010110
100101011010101010101001101001010101(136 bits)

1000(4 bits)

0101010110101010101001101001101001100101011010101010101010101001011001101010011001011001101001010110
100101011010101010101001101001010101(136 bits)

Manchester decode (IEEE 802)

11110000001001001011100000000001101000101101001110011100000001001111

Binary to Hex

F024B801A2D39C04F

024B 801A 2D39 C04F

Alternatively - remove 28 bits in the beginning - so,

0000000011010111000101010101 (28 bits)

1010101010011010011010011001010110101010101010100101100110101001100101100110100101011010010101
1010101010101001101001010101(128 bits = 64 manchester bits)

1000(4 bits)
Manchester decode (IEEE802)
0000001001001011100000000001101000101101001110011100000001001111
Binary to Hex
24B801A2D39C04F
02 4B 801A2D39 C0 4F

Back process - rtl_433 data to manchester decode - Second type of clock recovery by rtl_433
{161}006b8aad5534d32b55554b3532cd2b4ad554d2ac0

Hex to Binary =
1101011100010101010110101010100110100110100110010101101010101010101001011001101010011001011001
10100101011010010101101010101010011010010101011000000 (155 bits)

Remove
11010111000101010101(20 bits)
1010101010100110100110100110010101101010101010101010100101100110101001100101100110100101011010010101
1010101010101001101001010101(128 bits)
1000000 (7 bits)

101010101010011010011010011001010110101010101010101010100101100110101001100101100110100101011010010101
1010101010101001101001010101(128 bits)

Manchester decode (IEEE 802)
0000001001001011100000000001101000101101001110011100000001001111
Binary to Hex
24B801A2D39C04F
02 4B 801A2D39 C0 4F

Test decode
006b8aad554cd2d355554b3532cd2b4ad552acb40

Hex to Binary
110101110001010101011010101010100110011010010110100110101010101010101001011001101010011001011001
1010010101101001010110101010101001010101100101101000000 (155)

Remove 20 bits from beginning and 7 from end
101010101010100110011010010110100110101010101010101010100101100110101001100101100110100101011010010101
1010101010100101010110010110(128)

Manchester decode
0000000101001100100000000001101000101101001110011100000011110110

Binary to Hex
01 4C 801A2D39 C0 F6

MX Sensor decode
00dae2ab555334cd554b532cacb4ad2cad52cd53 Mx Sensor RL clone Triggered

1101101011100010101010110101010101010011001101001100110101010101010010110101001100101100101011001011
0100101011010010110010101101010100101100110101010011 (152 bits)

Remove 20 bits preamble
10101010101010011001101001100110101010101001011010100110010110010101100101101001010110100101100101
01101010100101100110101010011(129 bits)

Remove trailing 1 bit
10101010101010011001101001100110101010101010010110101001100101100101011001011010010101101001010110100101100101
0110101010010110011010101001 (128 bits)
Manchester decode (IEEE802)
0000000101001010000000110001011011101100111001101110000110100001
Binary to Hex
14A0316ECE6E1A1
01 4A 0316ECE6 E1A1

00dae2ab555334cd554b532b5335552aad52b2b5 Mx-sensor FL clone Trig
1101101011100010101010110101010101010011001101001100110101010101010010110101001100101011010100110011
0101010101010010101010101101010100101011001010110101
Remove 20 bit preamble and 1 trailing bit
1010101010101001100110100110011010101010101001011010100110010101101010011001101010101010100101010101
0110101010010101100101011010(128)
Manchester decode
0000000101001010000000110001011100010100000001111110000111011100
Bln to Hex
14A03171407E1DC
01 4A 03171407 E1 DC

{161}006b8aad5534d32b55554b3532cd2b4ad554d2ac0 (Random capture)
110101110001010101011010101010100110100110100110010101101010101010101001011001101010011001011001
10100101011010010101101010101010011010010101011000000(155)
11010 (Garbage 5 bits)
111000101010101 (Found Preamble 15 bits)
10101010101001101001101001100101011010101010101010100101100110101001100101100110100101011010010101
1010101010101001101001010101(128)
1000000(garbage trailing 7 bits)
Manchester decode
0000001001001011100000000001101000101101001110011100000001001111 (64 bits)
24B801A2D39C04F
02 4B 801A2D39 C0 4F

MX Sensor RL Trigger (Programmed for Elantra 2012 which uses TRW low line)
{160}00dae2ab555334b3554b532cacb4ad2cad532aad
0000000011011010 (Garbage 16 bits)
111000101010101(Preamble matching 15 bits)
1010101010101001100110100101100110101010101001011010100110010110010101100101101001010110100101100101
0110101010011001010101010110 (128 bits after preamble)
1 (Garbage trail bit)
111000101010101 (Found Preamble 15 bits)
Manchester decode 128 bits
0000000101001101000000110001011011101100111001101110000101111110
14D0316ECE6E17E
01 4D 0316ECE6 E1 7E

Basically - Match the 15 bit preamble (111000101010101) and then take 128 bits following preamble and discard the rest of the remaining bits

1101101011100010101010110101010101010011001101001011010101010101010010110101001100101100101011001011
0100101011010010110010101101010100110011001100101011

14C0316ECE6E157
01 4C 0316ECE6 E1 57

1101101011100010101010110101010101010011001101001011010101010101010010110101001100101011010100110011
01010101010100101010101101010101001010110100110011010000

{153}dae35555334b5554b532cacb4ad2cad53332b0 Mx sensor programmed for Honda Civic 2012

11011010111000110101010101010101010011001101001011010101010101010010110101001100101100101011001011
01001010110100101100101011010101001100110011001010110000

14C0316ECE6E157

Bitwise operations

Manchester decoded data

0000000101001100000000110001011011101100111001101110000101010111 (64 bits)

	B[0]		b[1]		b[2]		b[3]		b[4]		b[5]		b[6]		b[7]
<u>0000</u>	<u>0001</u>	<u>0100</u>	<u>1100</u>	<u>0000</u>	<u>0011</u>	<u>0001</u>	<u>0110</u>	<u>1110</u>	<u>1100</u>	<u>1110</u>	<u>0110</u>	<u>1110</u>	<u>0001</u>	<u>0101</u>	<u>0111</u>
P	P	T	T									F	F	C	C

B[0]	b[1]	b[2]	b[3]	b[4]	b[5]	b[6]	b[7]
<u>00000001</u>	<u>01001100</u>	<u>00000011</u>	<u>00010110</u>	<u>11101100</u>	<u>11100110</u>	<u>11100001</u>	<u>01010111</u>
PP	TT	ll	ll	ll	ll	FF	CC

```
#include <stdio.h>
```

```
int main()
```

{

```
unsigned char b0=1;
unsigned char b1=76;
unsigned char b2=3;
unsigned char b3=22;
unsigned char b4=236;
unsigned char b5=230;
unsigned char b6=225;
```

```
short b8=b0+b1+b2+b3+b4+b5+b6;  
printf("%x\n", b8);
```

```
return 0;
```


14A0316ECE6E1A1

Preamble 11011010111000101010101 (23 bits) = 0x6d7155. Used 24 bit length
rtl_433 -d 0 -f 315M -s 1024k -R 0 -X 'n=name,m=FSK_PCM,s=49,l=49,r=500,preamble={24}0x6d7155'

time : 2019-09-26 13:04:37
model : name count : 1 num_rows : 1 rows :
len : 129 data : aaa99a66aaa0a987ffe0169656a966a98
codes : {129}aaa99a66aaa0a987ffe0169656a966a98

101010101010011001101001100110101010101001011010100110010110010101100101101001010110100101100101100101
01101010100101100110101010011000(132 bits)

10101010101001100110100110011010101010100101101010011001011001010110010110100101011010010110100101100101
0110101010010110011010101001(128 bits)

1000 (4 trailing bits)

Manchester decode of 128 bits

14A0316ECE6E1A1

So, it works if I put the length of the preamble as actual length +1.

rtl_433 -d 0 -f 315M -s 1024k -R 0 -X 'n=name,m=FSK_PCM,s=49,l=49,r=500,preamble={16}0x7155'

time : 2019-09-26 13:14:52
model : name count : 1 num_rows : 1 rows :
len : 129 data : aaa99a66aaa5a996565a569656a966a98
codes : {129}aaa99a66aaa5a996565a569656a966a98

time : 2019-09-27 19:08:40
model : name count : 1 num_rows : 1 rows :
len : 160 data : 00dae2ab555334cb554b532cacb4ad2cad52d4d5
codes : {160}00dae2ab555334cb554b532cacb4ad2cad52d4d5

time : 2019-09-27 19:08:40
model : name count : 1 num_rows : 1 rows :
len : 153 data : dae35555334cd554b532cacb4ad2cad52cd530
codes : {153}dae35555334cd554b532cacb4ad2cad52cd530

{160}00dae2ab555334cb554b532cacb4ad2cad52d4d5

0000000011011010111000101010101101010101010011001101001100101101010101001011010100110010110010101
110010110100101011010010110010101101010100101101010011010101(160 bits)

Inverted

11111111001001010001110101010100101010101011001100101100110100101010101011010010101100110100110101
001101001011010100101101001101010010101011010010101100101010(160 bits)

Preamble = 111000101010101 =7155

Inverted preamble = 000111010101010 = eaa

1111111100100101(garbage 16 bits)

0001110101010101(preamble 15 bits)

01010101010101100110010110011010010101010110100101011001101001101010011010010110101001011010011010

0(garbage 1 bit)

0101010101010110011001011001101001010101010110100101011001101001101010011010010110101001011010011010

1001010101101001010110010101(128 bits) Manchester decode (G.E.Thomas)

0000000101001011000000110001011011101100111001101110000110001000

14B0316ECE6E188

Inverted output from the driver ff251d54aaaccb34aab4acd3534b52d352ad2b2a

1111111100100101000111010101010

0101010101010110011001011001101001010101010110100101011001101001101010011010010110101001011010011010

10010101011010010101100101010

bit_pos=15bitbuffer:: Number of rows: 1

[00] {160} ff 25 1d 54 aa ac cb 4a aa b4 ac d3 53 4b 52 d3 52 ac cc d4

manchester decode calledstart_pos=159size=128byte 0=254byte 1=179byte 2=252byte 3=233byte 4=19byte 5=25byte

6=30byte 7=168main function calledinvertedbitbuffer:: Number of rows: 1

byte 0=254byte 1=179byte 2=252byte 3=233byte 4=19byte 5=25byte 6=30byte 7=168

00FE B3 FC E9 13 19 1E A8

0000000101001011000000110001011011101100111001101110000110001000

14B0316ECE6E188

INVERTED

1111111010110100111111001110100100010011000110010001111001110111

FEB4FCE913191E77

So, no need to invert the bits.

byte 0=253byte 1=181byte 2=127byte 3=229byte 4=210byte 5=198byte 6=63byte 7=153

FD B5 7F E5 D2 C6 3F 99

bit_pos=15bitbuffer:: Number of rows: 1

[00] {160} 00 da e2 ab 55 53 34 b5 55 4b 53 2c ac b4 ad 2c ad 53 33 2b

manchester decode calledstart_pos=32

00dae2ab555334b5554b532cacb4ad2cad53332b

0000000011011010111000101010101101010101010100110011010010110101010101010100101101010011001011001010

110010110100101011010010110010101101010100110011001100101011(160 bits)

000000001101101(garbage 15 bits)

0111000101010101(preamble 16 bits)

101010101010100110011010010110101010101010010110101001100101100101011001011010010110100101100101

0110101010011001100110010101(128 bits)

1(1 bit)

```
bit_pos=13bitbuffer:: Number of rows: 1
[00] {161} 00 6b 8a ad 55 4c d3 33 55 55 4b 35 32 cd 2b 4a d5 55 55 54 00
manchester decode calledstart_pos=157size=128byte 0=1byte 1=74byte 2=128byte 3=26byte 4=45byte 5=57byte 6=192byte
7=0CRC passedAbort trap: 6
006b8aad554cd33355554b3532cd2b4ad555555400

0000000011010111000101010101101010101010100110011010011001100110101010101010101010010110011010100110
0101100110100101011010010101101010101010101010101010101010000000000
0000000011010(13 bits)
1110001010101011(16 bits)
010101010101001100110100110011001101010101010101010101001011001101010011001011001101001010110100101011
010101010101010101010101010101(128 bits = 157 from the start)
00000000000
010101010101001100110100110011001101010101010101010101001011001101010011001011001101001010110100101011
010101010101010101010101010101(128 bits = 157 from the start)

bit_pos=15bitbuffer:: Number of rows: 1
[00] {162} 00 da e2 ab 55 53 34 b5 55 45 8d 81 56 0d eb 4b 2b 54 cc ca c0
manchester decode calledstart_pos=77
00dae2ab555334b555458d81560deb4b2b54ccca0
0000000010110101110001010101011010101010101001100110100101101010101010101000101100011011000000101010
1100000110111101011010010110010101101010100110011001100101011000000
11000000110111101011010010110010101101010100110011001100101011000000

bit_pos=13bitbuffer:: Number of rows: 1
[00] {161} 00 6b 8a ad 55 4c d3 33 55 55 4b 35 32 cd 2b 4a d5 55 55 54 00
manchester decode calledstart_pos=30

bit_pos=15bitbuffer:: Number of rows: 1
[00] {160} 00 da e2 ab 55 53 34 ab 55 4b 53 2c ac b4 ad 2c ad 53 4c b5
manchester decode calledstart_pos=32
00dae2ab555334ab554b532cacb4ad2cad534cb5
00000000110110101110001010101011010101010101001100110100101011010101010100101101010011001011001010
110010110100101011010010110010101101010100110100110010110101(160 bits)
00000000110110101110001010101011010101010101001100110100101011010101010100101101010011001011001010
110010110100101011010010110010101101010100110100110010110101

bit_pos=12bitbuffer:: Number of rows: 1
[00] {160} 00 d7 15 5a aa 99 a6 66 aa aa 96 6a 65 9a 56 95 aa aa aa a8
manchester decode calledstart_pos=29

bit_pos=13bitbuffer:: Number of rows: 1
[00] {161} 00 6b 8a ad 55 4c d3 33 55 55 4b 35 32 cd 2b 4a d5 55 55 54 00
manchester decode calledstart_pos=157size=128byte 0=1byte 1=74byte 2=128byte 3=26byte 4=45byte 5=57byte 6=192byte
7=0CRC passedAbort trap: 6
1 4A 80 1A 2D 39 C0 0
(014A801A2D39C0)CRC8 (0x07)=0x0

006b8aad554cd33355554b3532cd2b4ad555555400
0000000011010111000101010101101010101010100110011010011001100110101010101010101010010110011010100110
0101100110100101011010010101101010101010101010101010101010000000000 (167 bits)
```

0000000011010(13 bits = bitpos)
1110001010101011(16 bit = preamble)
010101010101001100110100110011001101010101010101010010110011010100110010110011010010101101001010110100101011
010101010101010101010101010101(128 bits)
0000000000
111111EEEE1EEEEEE111111111E0EEE11EEE0EEE1E00E1E00E111111111111111

bit_pos=13bitbuffer:: Number of rows: 1
[00] {161} 00 6b 8a ad 55 4c d3 33 55 55 4b 35 32 cd 2b 4a d5 55 55 54 00
manchester decode calledstart_pos=159size=130byte 0=1byte 1=74byte 2=128byte 3=26byte 4=45byte 5=57byte 6=192byte
7=0CRC passedAbort trap: 6

bit_pos=13bitbuffer:: Number of rows: 1
[00] {161} 00 6b 8a ad 55 34 d3 33 55 55 4b 35 32 cd 2b 4a d5 54 b4 b4 00
manchester decode calledstart_pos=159size=130byte 0=2byte 1=74byte 2=128byte 3=26byte 4=45byte 5=57byte 6=192byte
7=102Abort trap: 6

2 4A 80 1A 2D 39 C0 66
(024A801A2D39C0)CRC8 (0x07)=0x66

bit_pos=13bitbuffer:: Number of rows: 1
[00] {161} 00 6b 8a ad 55 4c d3 2b 55 55 4b 35 32 cd 2b 4a d5 55 33 4c 00
manchester decode calledstart_pos=157size=128byte 0=1byte 1=75byte 2=128byte 3=26byte 4=45byte 5=57byte 6=192byte
7=41801a2d39_-----

time : **2019-09-28 18:08:31**
model : **Elantra** type : **TPMS** id : **System/L?**

014B801A2D39C029
(014B801A2D39C0)CRC8 (0x07)=0x29

/ FSK 8 byte Manchester encoded TPMS with CRC8 checksum.*

** Seen on Hyundai Elantra, Honda Civic ...*

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** (at your option) any later version.*

** TRW TPMS sensor FCC id GQ4-44T*

** Mode/Sensor status -shipping, test,parking, driving, first block mode*

** Battery voltage-Ok, low*

** Trigger information- LF initiate TM*

** Pressure- 1.4kPa*

** temperature-27 deg C*

** acceleration- 0.5 g*

Market - EU, America
 * Tire type - 450 kPa
 * Response time -8.14 seconds
 * ID-8 bytes
 * Preamble is 111 0001 0101 0101 (0x7155)
 * PPTT IDID IDID FFCC
 * Pressure in hex(One byte PP) to decimal+60 = pressure in kPa
 * Temperature hex(One byte TT) to decimal-50 = temp in C
 * ID in hex(2 Words = 4 bytes)
 * Flags (FF) = ???? ?SBT (Missing Acceleration, market - Europe/US/Asia, Tire type, Alert Mode, park mode, High Line vs Low Line etc)
 * S=Storage bit
 * B=Battery low bit
 * T=Triggered bit
 * C0 =1100 0000 = Battery OK, Not Triggered
 * C1 =1100 0001 = Battery OK, Triggered
 * C2 =1100 0010 = Battery Low, Not Triggered
 * C3 =1100 0011 = Battery Low, Triggered
 * C5 =1100 0101 = Battery OK, Triggered, Storage Mode
 * E1 =1110 0001 = Mx Sensor Clone for Elantra 2012 US market ? Low Line
 * C1 = Mx Sensor Clone for Genesis Sedan 2012 US market ? High Line

* CC = CRC8
 * 994A02226097C127
 * (99 4A 02 22 60 97 C1)CRC8 = 27
 * 024C801A2D39C197
 * (024C801A2D39C1)CRC8 = 97

* Manchester decoded data
 * 00000000101001100000000110001011011101100111001101110000101010111 (64 bits)

B[0]	b[1]	b[2]	b[3]	b[4]	b[5]	[b6]	b[7]
0000	0001	0100	1100	0000	0011	0001	0110
1100	1110	1100	1110	0110	1110	0001	0101
0111							0111

 * P P T T I I I I I I I I F F C C
 */

#include "decoder.h"

/*preamble = 111000101010101 0x71 0x55*/

static const uint8_t preamble_pattern[2] = {0x71,0x55}; // 16 bits

static int tpms_elantra2012_decode(r_device *decoder, bitbuffer_t *bitbuffer, unsigned row, unsigned bitpos)

```

{
data_t *data;
unsigned int start_pos;
bitbuffer_t packet_bits = {0};
uint8_t *b;
int id;
char id_str[16];
int code;
char code_str[16];

```

```

unsigned lf_triggered,battery_low, storage;
float pressure_kpa, temperature_c,pressure_psi;
int crc;

start_pos = bitbuffer_manchester_decode(bitbuffer, row, bitpos, &packet_bits, 64);
// require 64 data bits
if (start_pos-bitpos < 128) {
return 0;
}

b = packet_bits.bb[0];
crc = b[7];
if (crc8(b, 7, 0x07, 0x00) != crc) {
return 0;
}

```

```

id = b[2]<<24 | b[3]<<16 | b[4]<<8 | b[5];
sprintf(id_str, "%08x", id);
code=b[6];
sprintf(code_str, "%x", code);
pressure_kpa=b[0]+60;
pressure_psi=pressure_kpa*0.14503779473358;
temperature_c=b[1]-50;
storage=(b[6] & (1<<2));//3rd bit
battery_low=(b[6] & (1<<1));//2nd bit
lf_triggered=(b[6] & (1<<0));//1st bit

```

```

data = data_make(
"model",      "",  DATA_STRING,  "Elantra2012",
"type",       "",  DATA_STRING,  "TPMS",
"id",         "",  DATA_STRING,  id_str,
"pressure_kpa", "",  DATA_DOUBLE,  pressure_kpa,
"pressure_psi", "",  DATA_DOUBLE,  pressure_psi,
"temperature_c", "",  DATA_DOUBLE,  temperature_c,
"battery_low", "",  DATA_INT,      battery_low,
"LF_triggered", "",  DATA_INT,      lf_triggered,
"Storage",    "",  DATA_INT,      storage,
"Flags",      "",  DATA_STRING,   code_str,
NULL);

```

```

decoder_output_data(decoder, data);
return 1;
}

```

```

static int tpms_elantra2012_callback(r_device *decoder, bitbuffer_t *bitbuffer) {
int row;
unsigned bitpos;
int events = 0;

for (row = 0; row < bitbuffer->num_rows; ++row) {
bitpos = 0;
// Find a preamble with enough bits after it that it could be a complete packet
while ((bitpos = bitbuffer_search(bitbuffer, row, bitpos,

```

```

(const uint8_t *)&preamble_pattern, 16)) + 128 <=
bitbuffer->bits_per_row[row]) {
events += tpms_elantra2012_decode(decoder, bitbuffer, row, bitpos + 16);
bitpos += 15;
}
}

return events;
}

```

```

static char *output_fields[] = {
"model",
"type",
"id",
"pressure_kpa",
"pressure_psi",
"temperature_c",
"battery_low",
"LF_triggered",
"Storage",
"Flags",
NULL
};

```

```

r_device tpms_elantra2012 = {
.name      = "Elantra2012 TPMS",
.modulation = FSK_PULSE_PCM,
.short_width  = 49, // 12-13 samples @1024k
.long_width   = 49, // FSK
.reset_limit  = 50000, // Maximum gap size before End Of Message [us].
.decode_fn    = &tpms_elantra2012_callback,
.disabled     = 0,
.fields       = output_fields,
};

```

/* FSK 8 byte Manchester encoded TPMS with CRC8 checksum.

* Seen on Hyundai Elantra, Honda Civic ...

*

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*

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* it under the terms of the GNU General Public License as published by

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* (at your option) any later version.

* TRW TPMS sensor FCC id GQ4-44T

* Mode/Sensor status -shipping, test,parking, driving, first block mode

* Battery voltage-Ok, low

* Trigger information- LF initiate TM

* Pressure- 1.4kPa

* temperature-27 deg C

* acceleration- 0.5 g

* Market - EU, America

* Tire type - 450 kPa
 * Response time -8.14 seconds
 * ID-8 bytes

 * Preamble is 111 0001 0101 0101 (0x7155)

 * PPTT IDID IDID FFCC
 * Pressure in hex(One byte PP) to decimal+60 = pressure in kPa
 * Temperature hex(One byte TT) to decimal-50 = temp in C
 * ID in hex(2 Words = 4 bytes)
 * Flags (FF) = ???? ?SBT (Missing Acceleration, market - Europe/US/Asia, Tire type, Alert Mode, park mode, High Line vs Low Line etc)
 * S=Storage bit
 * B=Battery low bit
 * T=Triggered bit
 * C0 =1100 0000 = Battery OK, Not Triggered
 * C1 =1100 0001 = Battery OK, Triggered
 * C2 =1100 0010 = Battery Low, Not Triggered
 * C3 =1100 0011 = Battery Low, Triggered
 * C5 =1100 0101 = Battery OK, Triggered, Storage Mode
 * E1 =1110 0001 = Mx Sensor Clone for Elantra 2012 US market ? Low Line
 * C1 = Mx Sensor Clone for Genesis Sedan 2012 US market ? High Line

* CC = CRC8
 * 994A02226097C127
 * (99 4A 02 22 60 97 C1)CRC8 = 27
 * 024C801A2D39C197
 * (024C801A2D39C1)CRC8 = 97

* Manchester decoded data
 * 00000001010011000000000110001011011101100111001101110000101010111 (64 bits)

* B[0]	b[1]	b[2]	b[3]	b[4]	b[5]	b[6]	b[7]
* 0000 0001	0100	1100	0000	0011	0001	0110	1110
* P P	T T	I I	I I	I I	I I	F F	C C

 */

#include "decoder.h"

/*preamble = 111000101010101 0x71 0x55*/

static const uint8_t preamble_pattern[2] = {0x71,0x55}; // 16 bits

```

static int tpms_elantra2012_decode(r_device *decoder, bitbuffer_t *bitbuffer, unsigned row, unsigned bitpos)
{
    data_t *data;
    unsigned int start_pos;
    bitbuffer_t packet_bits = {0};
    uint8_t *b;
    int id;
    char id_str[16];
    int code;
    char code_str[16];
    unsigned lf_triggered,battery_low, storage;
  
```

```

float pressure_kpa, temperature_c, pressure_psi;
int crc;
start_pos = bitbuffer_manchester_decode(bitbuffer, row, bitpos, &packet_bits, 64);
// require 64 data bits
if (start_pos-bitpos < 128) {
return 0;
}
b = packet_bits.bb[0];
crc = b[7];
if (crc8(b, 7, 0x07, 0x00) != crc) {
return 0;
}

```

```

id = b[2]<<24 | b[3]<<16 | b[4]<<8 | b[5];
sprintf(id_str, "%08x", id);
code=b[6];
sprintf(code_str, "%x", code);
pressure_kpa=b[0]+60;
pressure_psi=pressure_kpa*0.14503779473358;
temperature_c=b[1]-50;
storage=(b[6] & (1<<2));//3rd bit
battery_low=(b[6] & (1<<1));//2nd bit
lf_triggered=(b[6] & (1<<0));//1st bit

```

```

data = data_make(
"model", "", DATA_STRING, "Elantra2012",
"type", "", DATA_STRING, "TPMS",
"id", "", DATA_STRING, id_str,
"pressure_kpa", "", DATA_DOUBLE, pressure_kpa,
"pressure_psi", "", DATA_DOUBLE, pressure_psi,
"temperature_c", "", DATA_DOUBLE, temperature_c,
"battery_low", "", DATA_INT, battery_low,
"LF_triggered", "", DATA_INT, lf_triggered,
"Storage", "", DATA_INT, storage,
"Flags", "", DATA_STRING, code_str,
NULL);

```

```

decoder_output_data(decoder, data);
return 1;
}

```

```

static int tpms_elantra2012_callback(r_device *decoder, bitbuffer_t *bitbuffer) {
int row;
unsigned bitpos;
int events = 0;

for (row = 0; row < bitbuffer->num_rows; ++row) {
bitpos = 0;
// Find a preamble with enough bits after it that it could be a complete packet
while ((bitpos = bitbuffer_search(bitbuffer, row, bitpos,
(const uint8_t *)&preamble_pattern, 16)) + 128 <=

```

```

bitbuffer->bits_per_row[row]) {
events += tpms_elantra2012_decode(decoder, bitbuffer, row, bitpos + 16);
bitpos += 15;
}
}

return events;
}

static char *output_fields[] = {
"model",
"type",
"id",
"pressure_kpa",
"pressure_psi",
"temperature_c",
"battery_low",
"LF_triggered",
"Storage",
"Flags",
NULL
};

r_device tpms_elantra2012 = {
.name      = "Elantra2012 TPMS",
.modulation = FSK_PULSE_PCM,
.short_width  = 49, // 12-13 samples @1024k
.long_width   = 49, // FSK
.reset_limit  = 50000, // Maximum gap size before End Of Message [us].
.decode_fn    = &tpms_elantra2012_callback,
.disabled     = 0,
.fields       = output_fields,
};

```