CANGO FMS Interface
Serial User Guide

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Related Documents
SAE J1939 / 71 Vehicle Application Layer Clarification of FMS data
SAE J1708
SAE J1587

Notation of special characters
[CR] Enter key or character code carriage return (0x0D) – if you will use Hercules you must type: $0D
[LF] character code linefeed (0x0A)
[NULL] means no character

1 Connection

After the hardware connection you can connect to the interface with terminal software (i.e.: Terminal or Hercules). The default configuration of the FMS interface is:

- 115200 bps;
- 8 Data bits;
- 1 Stop bit;
- No handshake (flow control).

Below is an example about how to connect to the interface with Terminal and the steps you will need to do:

1. First you need to set:

    - "Data bits" to 8;
    - "Parity" to "none";
    - "Stop bits" to 1;
    - "Handshaking" to "none" or "RTS/CTS";

2. Set the "Baud rate"; From factory by default is set to 115200 bps;
3. Set the "COM Port"; In this example the port is COM1, your port may differ;
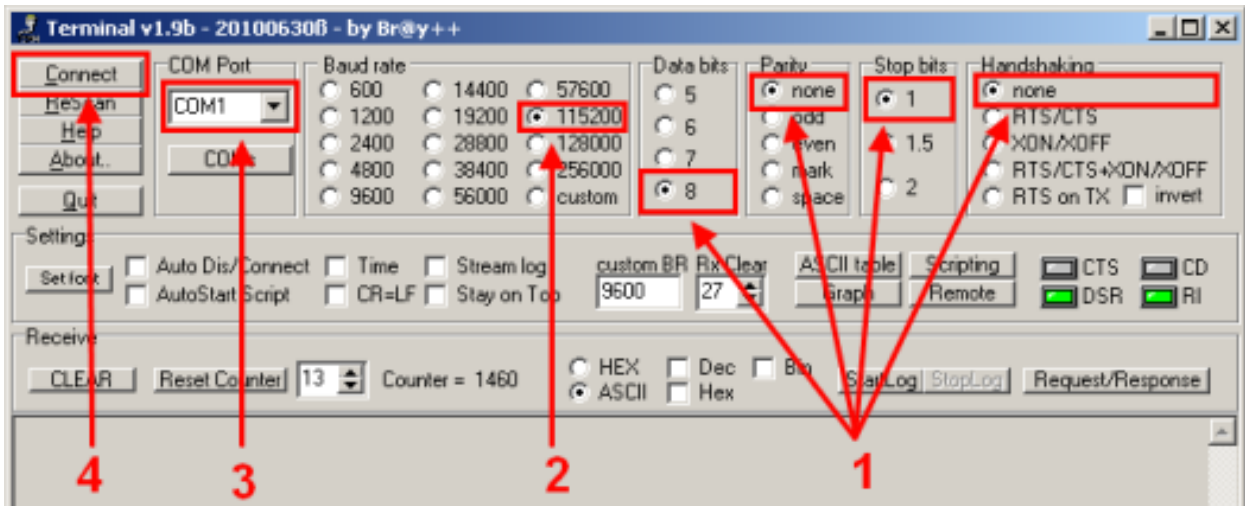4. Press "Connect";

Fig 1 - Terminal, before connection to the interface for default configuration.

After the configuration of the connection parameters and connecting to the COM port, the device should sent data in Readable Table Frame format (factory settings). Below is an example:
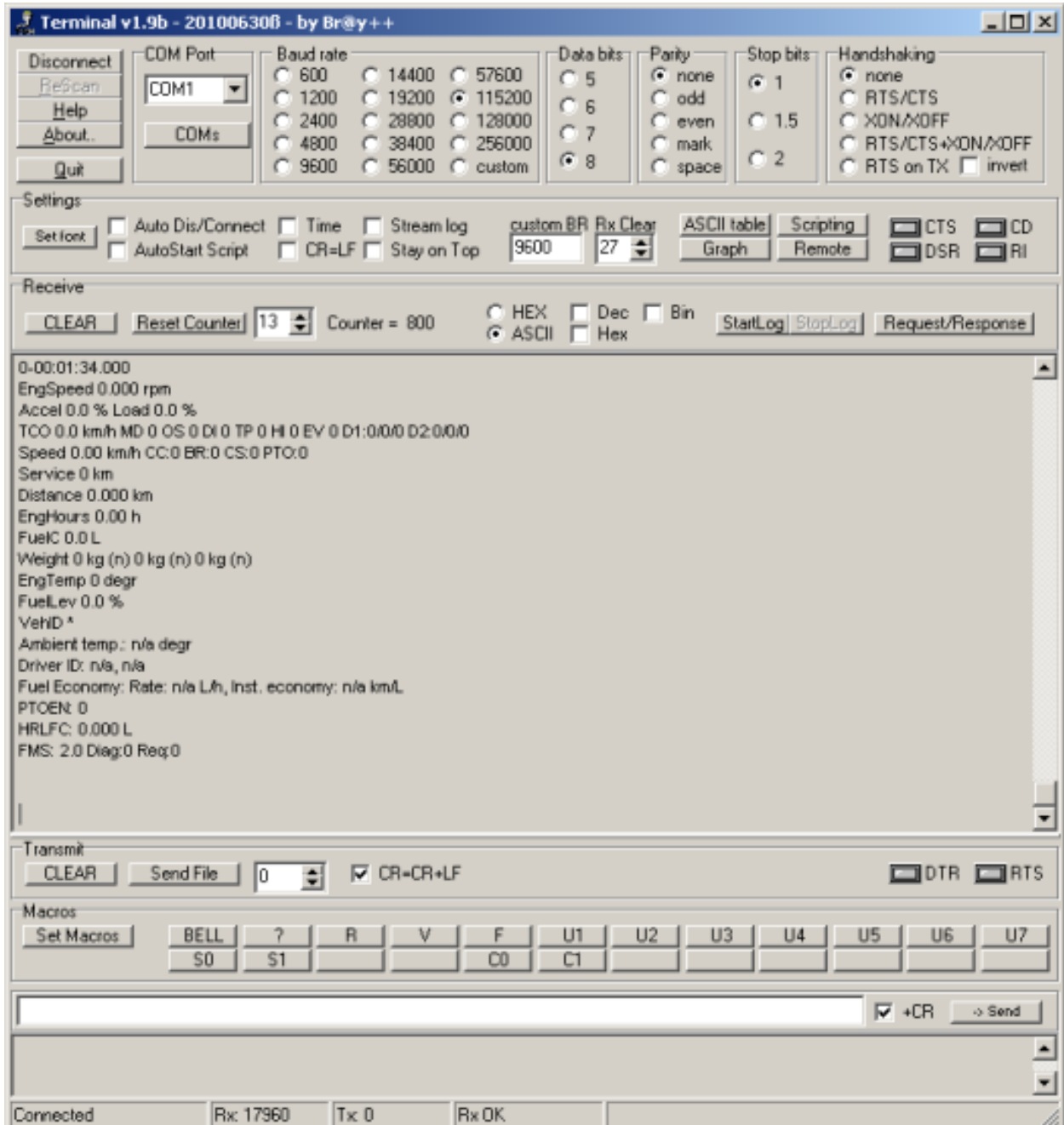

Fig 2 - Terminal, connected to the interface, set on readable mode.

2   The Output Protocol (FMS Mode)

2.1   Overview

In normal operating mode the interface reads the vehicle data and sends the data through the RS-232 serial cables and CANbus output. Both outputs, RS232 and CANbus, are active.

The serial output has three main types of frames. Readable table frame easy to read by human operator, Spreadsheet frame and five "T" frames, for instant values, for total values, for tachograph values and for the MILs.

The ASCII output for the serial link is built up and sent either in a cycle period given by the #sint command. The serial output is given in the format defined by the #sint parameters and #mask parameter. For the complete Serial guide please see chapter 3.

The data is also being sent like standard 2.0 J1939/FMS protocol on the CAN2 bus port.

Spreadsheet Frame	Readable Table Frame	"T" Frames
One line holds all parameter values separated by the field separator character (comma by default) character. Configurable prefix and suffix. Filter Mask on each FMS Frame. Configurable send time between 2 messages.	Readable Table frame with variable names and physical units. Useful for testing on site.	**5 standard frames:** T1 – Instant values. T2 – Totals and calculated values. T3 – Threshold compare values. T5 – Tachograph values. T6 – Diagnostic Trouble Codes. **Requests:** #T1[CR] – Requests the T1 message. #T2[CR] – Requests the T2 message. #T3[CR] – Requests the T3 message. #T5[CR] – Requests the T5 message. #T6[CR] – Requests the T6 message. **Set messages:** $T2 – Sets the totals and calculated values. $T3 – Sets the threshold compare values

Table 1 - General description of the frames.

2.2 Spreadsheet frame

When spreadsheet frame is enabled, a reduced spreadsheet frame without any variable names and units is selected. All numerical values are separated by the field separator character (comma by default). One line holds all values selected with the mask command. Similar to the readable frame all variables with special meaning or that are not available are marked with the characters 'n', 'e', 'o' or '*'. The line is started by the prefix (#pfx command, default is a blank prefix) and terminated by the suffix (#sfx command, [CR][LF] is default).

String: [Prefix][timestamp],[value01],[value02], … ,[valueN][Suffix]

String	FMS Name	Mask
[Prefix]		
[Time stamp],		
[Engine Speed],	EEC1	Bit 0
[Accelerator pedal],[Engine load],	EEC2	Bit 1
[TCO speed],[MD],[OS],[DI],[TP],[HI],[EV],[D2A],[D1WS],[D1TS],[D2A],[D2WS],[D2TS],	TCO	Bit 2
[WBSD],[CC],[BR],[CS],[PTO],	CCVS	Bit 3
[Service],	SERV	Bit 4
[Distance],	VDHR	Bit 5
[Engine on time],	HOURS	Bit 6
[Total fuel consumption],	LFC	Bit 7
[Axle weight 0],[Axle weight 1],[Axle weight 2]	VW	Bit 8
[Coolant temperature],	ET1	Bit 9
[Fuel level],	DD	Bit 10
[Vehicle ID],	VI	Bit 11
[Ambient Temperature],	AMB	Bit 12
[Driver 1 ID], [Driver 2 ID],	DI	Bit 13
[Fuel rate],[Instant fuel economy],	LFE	Bit 14
[PTO engagement],	PTODE	Bit 15
[Total fuel high resolution]	HRLFC	Bit 16
[Suffix]		

Table 2 – Parameter on the Spreadsheet frame.

The prefix and the suffix are configurable. By default the prefix is empty and the suffix is [CR] [LF].
The time between two messages can be configured by the #sint command.

5

Measurements units			
Engine speed	Rpm	Fuel Level	L
Accelerator Pedal	%	Vehicle ID	ASCI
Engine Percent Load	% max	Ambient Temperature	°C
WBSD (Wheel Based Speed)	Km/h	Driver ID	ASCI
Service	Km	Fuel Rate	L/h
Distance	Km	Instant Fuel Economy	Km/L
Engine ON Time	Hours	PTO Engagement	1 or 0
Total Fuel Consumption	L	Total Fuel High Resolution	L
Axle weight 0,1,2	Kg	TCO Speed	Km/h
Coolant Temp.	°C	Tachograph (see table 4)	

Table 3 – Measurements units.

Tachograph		
Sign	**Value**	**Meaning**
MD	0 or 1	Motion detected (1: yes, 0: no)
OS	0 or 1	Over speed detected (1: yes, 0: no)
DI	0 or 1	Direction (0: forward, 1: reverse)
TP	0 or 1	Tachograph performance (1: analyze, 0: normal)
HI	0 or 1	Handling information (1: yes, 0: no)
EV	0 or 1	Tachograph event (1: yes, 0: no)
D1A	0 or 1	Driver 1 information (1: present, 0: absent)
D1WS	0 ... 7	Working state driver 1 (see table 5)
D1TS	0 ...15	Time state driver 1 (see table 5)
D2A	0 or 1	Driver 2 information (1: present, 0: absent)
D2WS	0 ... 7	Working state driver 2 (see table 5)
D2TS	0 ...15	Time state driver 2 (see table 5)

Table 4 - Tachograph values description.

Driver Information			
Time state		**Working state**	
0	Normal	0	Rest
1	15 min. bef. 4 ½ hours	1	Available
2	4 ½ hours reached	2	Work
3	15 min. bef. 9 hours	3	Drive
4	9 hours reached	6	Error
5	15 min. bef. 16 hours	7	Not available
6	16 hours reached		
14	Error		
15	Not available		

Table 5 - Driver information.

2.3   Readable table frame

When Readable Table frame is enabled, the output is set to readable 'screen format' with variable names and physical units.

Identifier String

0-00:00:29.000
EngSpeed 0.000 rpm
Accel 0.0 % Load 0.0 %
TCO 0.0 km/h MD 0 OS 0 DI 0 TP 0 HI 0 EV 0 D1:0/0/0 D2:0/0/0
Speed 0.00 km/h CC:0 BR:0 CS:0 PTO:0
Service 0 km
Distance 0.000 km
EngHours 0.00 h
FuelC 0.0 L
Weight 0 kg (n) 0 kg (n) 0 kg (n)
EngTemp 0 degr
FuelLev 0.0 %
VehID *
Ambient temp.: n/a degr
Driver ID:n/a,n/a
Fuel Economy: Rate: n/a L/h, Inst. economy: n/a km/L
PTOEN: 0
HRLFC: 0.000 L
FMS: 2.0 Diag:0 Req:0

2.4   "T" Frames

When "T" Frames are enabled the output data is organized in serial frames. The "T" frames are 5 standard messages:

- Instant (actual) values (T1 frame)
- Total and calculated values (T2 frame)
- Threshold compare values (T3 frame)
- Tachograph values (T5 frame)
- Diagnostic Trouble Codes (T6 frame)

2.5   Frames timing

Each serial frame can be configured to be broadcasted at a period of time with a delay (offset) from startup. Below, you can see an example of timing diagram. X,Y,Z are generic frames and can be any of the described above.
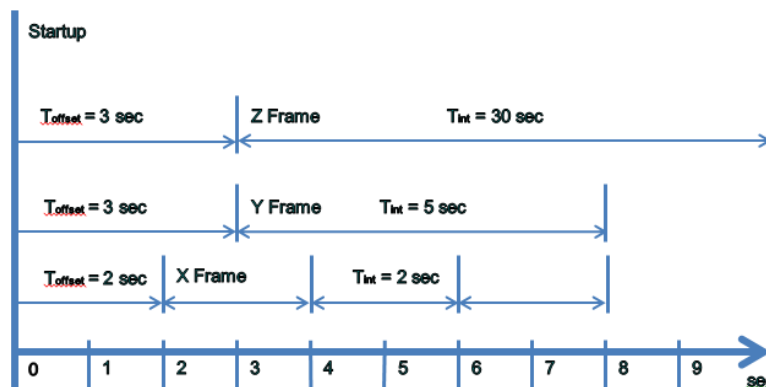

Fig 3 – Example of timing diagram for serial frames

2.5.1 Messages

2.5.1.1 Instant values - T1

This frame contains the instant values and it is sent at a time interval set by the #sint command or on request. To disable the timed broadcast set the interval to 0 seconds.

String	Measurements units	Data type
[Prefix[1]]T1,		
[Speed],	Km/h	Float, 0 to 250.996 Km/h, Resolution 1/256 Km/h
[Engine],	Rpm	Float, 0 to 8031.875 Rpm, Resolution 0.125 Rpm
[Fuel consumption],	l/h	Float, 0 to 3212.75 l/h, Resolution 0.05 l/h
[Fuel level primary tank],	%	Float, 0 to 100 %, Resolution 0.4 %
[Axel weight 1],	Kg	Float, 0 to 32127.5 Kg, Resolution 0.5 Kg
[Axel weight 2],	Kg	Float, 0 to 32127.5 Kg, Resolution 0.5 Kg
[Axel weight 3],	Kg	Float, 0 to 32127.5 Kg, Resolution 0.5 Kg
[Axel weight 4],	Kg	Float, 0 to 32127.5 Kg, Resolution 0.5 Kg
[Turbo pressure],	kPa	Float, 0 to 8031.875 kPa, Resolution 0.125 kPa
[Coolant temperature],	°C	Integer, -40 to 210 °C, Resolution 1 °C
[Accelerator pedal],	%	Float, 0 to 100 %, Resolution 0.4 %
[Torque],	%max	Integer, 0 to 250 %, Resolution 1 %
[Firmware version],		Char
[Battery voltage],	Volts	Float, 0 to 3212.75 Volts, Resolution 0.05 Volts
[Coolant level],	%	Float, 0 to 100 %, Resolution 0.4 %
[Oil temperature],	°C	Float, -273 to 1734.96875 °C, Resolution 1/32 °C
[Oil level],	%	Float, 0 to 100 %, Resolution 0.4 %
[Throttle position],	%	Float, 0 to 100 %, Resolution 0.4 %
[Air inlet pressure],	kPa	Integer, 0 to 500 kPa, Resolution 2 kPa
[Fuel level secondary tank],	%	Float, 0 to 100 %, Resolution 0.4 %
[Transmission current gear],		Integer, 0 is Neutral; 1 to 125 is forward; -125 to -1 is reverse; 251 is parked.
[Seat belt],		Char, 0 - Not buckled; 1 - Ok; seat belt is buckled; 2 - Error or switch state cannot be determined; 3 - Not available.
[Engine oil pressure],	kPa	Float, 0 to 1000 kPa, Resolution 4 kPa
[Wet tank air pressure]	kPa	Float, 0 to 2000 kPa, Resolution 8 kPa
[Suffix[2]]		

Table 6 – Parameter of the T1 frame, with the respective units and data type.

---

[1] *Prefix is configurable. By default the prefix is empty.*
[2] *Suffix is configurable. By default the suffix is [CR][LF].*

2.5.1.2 Totals and calculated values – T2

This frame contains the total and calculated values and it is sent at a time interval set by the #sint command or on request. To disable the timed broadcast set the interval to 0 seconds.

String	Measurements units	Data type
[Prefix[3]]T2,		
[Mileage],	Km	Float, 0 to 21055406 km, Resolution 0.005 km
[Total fuel],	Liter	Float, 0 to 2105540607.5 L, Resolution 0.5 L
[Fuel used at cruise],	Liter	Float, 0 to 2105540607.5 L, Resolution 0.5 L
[Fuel used at drive],	Liter	Float, 0 to 2105540607.5 L, Resolution 0.5 L
[Idle longer than 5 minutes],	Times	Integer, 0 to 65535 times, Resolution 1 time
[Idle longer than 10 minutes],	Times	Integer, 0 to 65535 times, Resolution 1 time
[Total idle time],	Sec.	Integer, 0 to 4294967295 s, Resolution 1 s
[Total time PTO],	Sec.	Integer, 0 to 4294967295 s, Resolution 1 s
[Time cruise],	Sec.	Integer, 0 to 4294967295 s, Resolution 1 s
[Rpm > threshold RPM 1],	Sec.	Integer, 0 to 4294967295 s, Resolution 1 s
[Rpm > threshold RPM 2],	Sec.	Integer, 0 to 4294967295 s, Resolution 1 s
[Speed > threshold speed 1],	Sec.	Integer, 0 to 4294967295 s, Resolution 1 s
[Speed > threshold speed 2],	Sec.	Integer, 0 to 4294967295 s, Resolution 1 s
[Speed > threshold speed 3],	Sec.	Integer, 0 to 4294967295 s, Resolution 1 s
[Brake apps],	Times	Integer, 0 to 65535 times, Resolution 1 time
[Clutch apps],	Times	Integer, 0 to 65535 times, Resolution 1 time
[Engine on],	Sec.	Integer, 0 to 4294967295 s, Resolution 180 s
[Time torque > 90%],	Sec.	Integer, 0 to 4294967295 s, Resolution 1 s
[Fuel rate average]	L/h	Float, 0 to 3212.75 l/h, Resolution 0.05 l/h
[Suffix[4]]		

Table 7 - Parameter of the T2 frame, with the respective units.

2.5.1.3 Threshold compare values – T3

This frame contains the threshold compare values and it is sent back by request and also as a result of #T3 set command.

String	Measurements units	Data type
[Prefix[5]]T3,		
[Threshold RPM 1],	Rpm	Float, 0 to 8031.875 Rpm, Resolution 0.125 Rpm
[Threshold RPM 2],	Rpm	Float, 0 to 8031.875 Rpm, Resolution 0.125 Rpm
[Threshold speed 1],	Km/h	Float, 0 to 250.996 Km/h, Resolution 1/256 Km/h
[Threshold speed 2],	Km/h	Float, 0 to 250.996 Km/h, Resolution 1/256 Km/h
[Threshold speed 3]	Km/h	Float, 0 to 250.996 Km/h, Resolution 1/256 Km/h
[Suffix[6]]		

Table 8 - Parameter of the T3 frame, with the respective units

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[3] *Prefix is configurable. By default the prefix is empty.*
[4] *Suffix is configurable. By default the suffix is [CR][LF].*
[5] *Prefix is configurable. By default the prefix is empty.*
[6] *Suffix is configurable. By default the suffix is [CR][LF].*

2.5.1.4 Tachograph values – T5

This frame contains tachograph data and it is sent at a time interval set by the #sint command or on request. To disable the timed broadcast set the interval to 0 sec.

String	Measurement units	Data type / Meaning
[Prefix[7]]T5,		
[Driver 1 work state],	0 or 1,	Working state (see Table 5)
[Driver 2 work state],	0 or 1	Working state (see Table 5)
[Driver recognize],	0 or 1	Driver recognition (1: yes, 0: no)
[Driver 1 time state],	0 or 1	Time state (see Table 9)
[Card driver 1 present],	0 or 1	Driver 1 information (1: present, 0: absent)
[Over speed],	0 or 1	Overspeed detected (1: yes, 0: no)
[Driver 2 time state],	0 or 1	Time state (see Table 10)
[Card driver 2 present],	0 or 1	Driver 2 information (1: present, 0: absent)
[Tacho event],	0 or 1	Tachograph event (1: yes, 0: no)
[Handling info],	0 or 1	Handling information (1: yes, 0: no)
[Tacho performance],	0 or 1	Tachograph performance (1: analyze, 0: normal)
[Direction indicator],	0 or 1	Direction (0: forward, 1: reverse)
[Output shaft speed],	Rpm	Float, 0 to 8031.875 Rpm, Resolution 0.125 Rpm
[TCO vehicle speed],	Km/h	Float, 0 to 250.996 Km/h, Resolution 1/256 Km/h
[Driver ID 1],		Char
[Driver ID 2]		Char
[Suffix[8]]		

Table 11 - Parameter of the T5 frame, with the respective units.

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[7] *Prefix is configurable. By default the prefix is empty.*
[8] *Suffix is configurable. By default the suffix is [CR][LF].*

2.5.1.5 Diagnostic Trouble Codes – T6

This frame contains the Diagnostic Trouble Codes and it is sent at a time interval set by the #sint command or on request. To disable the timed broadcast set the interval to 0 sec.

In this frame parameters are sent as decimal base system, to understand the meaning is necessary to converter from decimal to binary base system. After having the value of the parameter you can see the tables bellow to extract the meaning.

String	Bit mapping							
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
[Prefix[9]]T6,								
[Warning lamps status],	Malfunction Lamp Status		Red Stop Lamp Status		Amber Warning Lamp Status		Protect Lamp Status	
[Seat belt reminder],	Reserved						Seat Belt Reminder	
[Handbrake On],	Reserved						Hand Brake ON Lamp	
[Battery malfunction],	Fault Active	Reserved			Failure Mode Indicator			
[Coolant temperature],	Fault Active	Reserved			Failure Mode Indicator			
[Oil pressure],	Fault Active	Reserved			Failure Mode Indicator			
[Brake pads wear],	Axle Number					Brake Stroke Status		Wheel
[Stop light],	Reserved						Red Stop Lamp Status	
[Electronic water fault],	Under Research & Development							
[Particle filter fault],	Under Research & Development							
[Exhaust gas fault],	Under Research & Development							
[ABS malfunction],	Reserved				ABS Fully Operational		ABS Warn Lamp	
[Oil level fault]	Fault Active	Reserved			Failure Mode Indicator			
[Suffix[10]]								

Table 12 - Parameters of the T6 frame, and respective Bit mapping.

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[9] *Prefix is configurable. By default the prefix is empty.*
[10] *Suffix is configurable. By default the suffix is [CR][LF].*

Meaning of the data	
Malfunction Indicator Lamp Status	00 = Off 01 = On 10 = Error condition 11 = Not available
Red Stop Lamp Status	
Amber Warning Lamp Status	
Protect Lamp Status	
ABS Warn Lamp	
Hand Brake ON Lamp	
Seat Belt Reminder	
Fault Active	0 = Fault not Active 1 = Fault Active
Axle Number	0-1111 = Front to Back
Brake Stroke Status	000 = OK 001 = Out of adjustment 010 = Delay brake return 011 = Brake pads worn 100 = Delayed brake application 101 = Reserved 110 = Error 111 = Not available
Wheel	1 = Left Wheel 0 = Right Wheel
ABS Fully Operational	00 = Not Fully Operational 01 = Fully Operational 10 = Reserved 11 = Not available
Failure Mode Indicator	00000 = Data valid but above normal operational range (e.g. engine overheating for Coolant Temperature) 00001 = Data valid but below normal operational range (e.g. engine oil pressure too low) 00010 = Data erratic, intermittent, or incorrect 00011 = Voltage above normal or shorted high 00100 = Voltage below normal or shorted low 00101 = Current below normal or open circuit 00110 = Current above normal or grounded circuit 00110 = Current above normal or grounded circui 01000 = Abnormal frequency, pulse width, or period 01001 = Abnormal update rate 01010 = Abnormal rate of change 01011 = Failure mode not identifiable 01100 = Bad intelligent device or component 01101 = Out of Calibration 01110 = Special Instructions 01111 - 11111 = Reserved for future assignment

Table 13 – Meaning of parameters in the T6 frame.

2.5.2 Requests

This message is sent to the interface to request one of the frames. This command will make the FMS interface to send only one time the frame requested.

Command syntax	Description
#T1[CR][LF]	This message is a request for instant values.
#T2[CR][LF]	This message is a request for total values.
#T3[CR][LF]	This message is a request for threshold compare values.
#T5[CR][LF]	This message is a request for tachograph data.
#T6[CR][LF]	This message is a request for DTCs status.

Table 14 – Commands to request a Frame.

2.5.3 Sets

2.5.3.1 Totals - #T2

This message is sent to the interface to set the T2 frame parameters. This is to set the values to as showed by the vehicle when they are calculated by the FMS interface.

String	Measurements units
#T2,	
[Mileage],	Km
[Total fuel],	Liter
[Fuel used at cruise],	Liter
[Fuel used at drive],	Liter
[Idle longer than 5 minutes],	Times
[Idle longer than 10 minutes],	Times
[Total idle time],	Sec.
[Total time PTO],	Sec.
[Time cruise],	Sec.
[Rpm > threshold RPM 1],	Sec.
[Rpm > threshold RPM 2],	Sec.
[Speed > threshold speed 1],	Sec.
[Speed > threshold speed 2],	Sec.
[Speed > threshold speed 3],	Sec.
[Brake apps],	Times
[Clutch apps],	Times
[Engine on],	Sec.
[Time torque > 90%],	Sec.
[Fuel rate average]	L/h
[CR][LF]	

Table 15 – Command to set the total and calculated values.

2.5.3.2 Threshold compare values - #T3

On the fms interface there is not problem. On the car you can have dtc errors and you might have to disconnect the battery of the car to restart the ecus and solve this problem. this should not affect the car permanently.

String	Measurements units
#T3,	
[threshold_rpm_1],	Rpm
[threshold_rpm_2],	Rpm
[threshold_speed_1],	Km/h
[threshold_speed_2],	Km/h
[threshold_speed_3]	Km/h
[CR][LF]	

Table 16 - Command to set the threshold compare values.

3 CONFIGURATION MODE

3.1 General Considerations about Configuration Mode

In order to configure CANGO Telematic Interface, the user should use the commands described below and border them with #CFG Command at the beginning and #reset Command at the end.

Command		Description
#CFG[CR][LF]		Enter Configuration Mode and get current configuration
#command_1[CR][LF]		First command
#command_2[CR][LF]		Second command
#command_n[CR][LF]		n'th command
#CFG[CR][LF]		Verify the actual configuration
#save[CR][LF]	#discard[CR][LF]	Save or discard your configuration
#reset[CR][LF]	#FMS[CR][LF]	Reset the interface if you saved your configuration or return to FMS mode.

Table 17 - Example of commands.

3.2 Commands overview

All commands will start with "#" (0x23, hash character, or pound sign) and will end with Carriage Return and Line Feed (0x0D and 0x0A) characters.

Syntax	Command description
#CFG[CR][LF]	Enter Configuration Mode (Config Mode) and show current configuration
#FMS[CR][LF]	Enter Operating Mode (FMS Mode)
#sbaud___[CR][LF]	Show or set the RS232 baud rate
#cbaud___[CR][LF]	Show or set the CAN baud rate
#sint___[CR][LF]	Show or set the time interval between serial output data frames
#soff___[CR][LF]	Show or set the time offset for serial output data frames
#mask___[CR][LF]	Show or set the mask for spreadsheet frame
#spt___[CR][LF]	Show or set the field separator character
#pfx___[CR][LF]	Show or set the prefix of some serial output data frames
#sfx___[CR][LF]	Show or set the suffix of some serial output data frames
#save[CR][LF]	Save the current configuration
#discard[CR][LF]	Return to the last saved configuration
#reset[CR][LF]	Reset the CANGO Telematic Interface

Table 18 - Description of commands.

3.3   Configuration Mode - #CFG command

Enables the CANGO FMS interface to accept Configuration Commands, and lists the current configuration. In Configuration Mode no protocol data is transmitted through the Rs232 serial cables and CANbus output (CAN 2).

Log	Description
#CFG[CR][LF]	Enter Configuration Mode and show current configuration
Configuration Mode[CR][LF]	Entered Configuration Mode. This will be answered only if the mode is changed from FMS to CFG
ver,030212,F0,MAN[CR][LF]	Version date and vehicle supported
sbaud,115200[CR][LF]	Serial baud rate
cbaud,250000[CR][LF]	CAN baud rate
sint,2,0,0,0,0,0,0,0,0,0[CR][LF]	Time period between frames
soff,0,0,0,0,0,0,0,0,0,0[CR][LF]	Offset time for every frame
mask,001FFFFF[CR][LF]	Mask value for spreadsheet frame
spt,[,][CR][LF]	Separator (will always be between brackets)
pfx,[NULL][CR][LF]	Prefix (in case of special character, will be between brackets)
sfx,[CR][LF]	Suffix (in case of special character, will be between brackets)

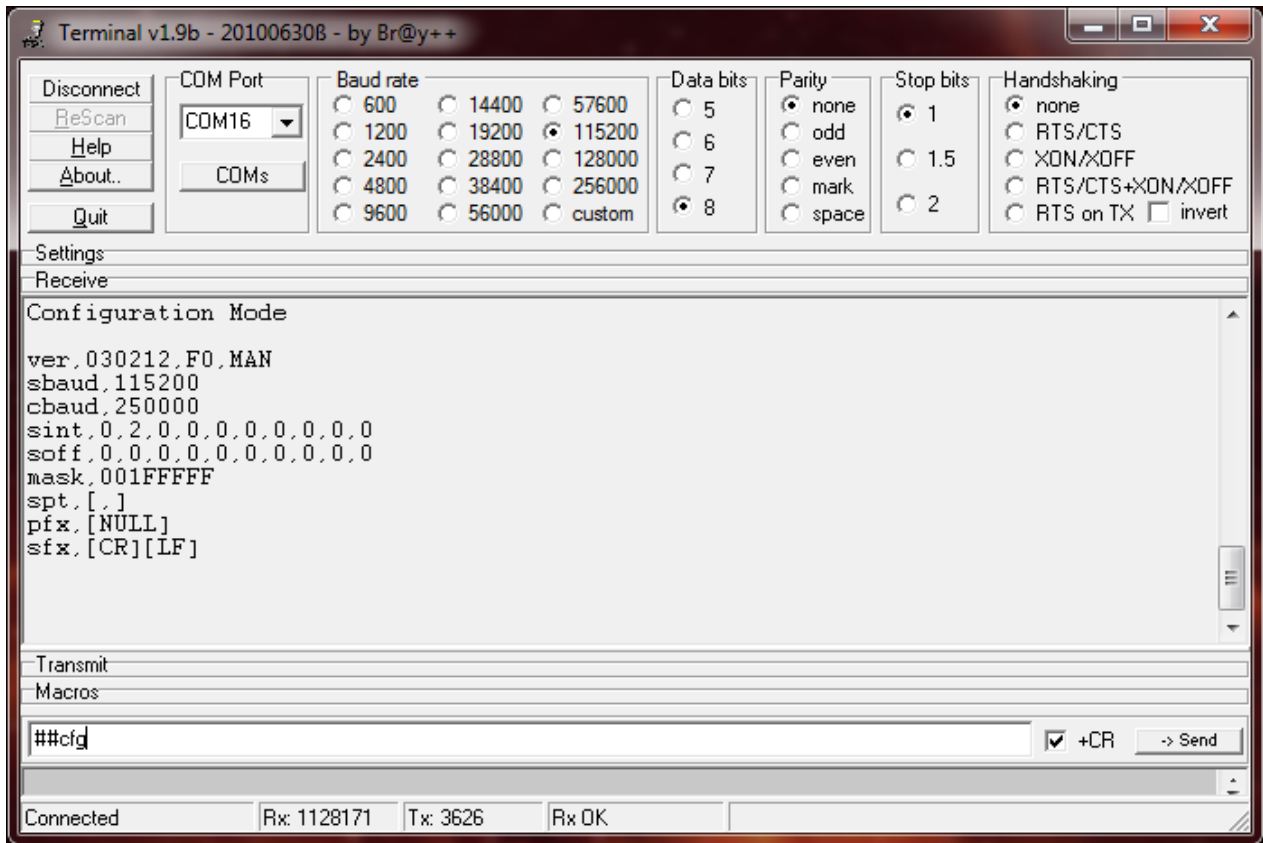*Table 19 - Description of #CFG command and the possible answers.*

Fig 4 – Example of #CFG command, using the Terminal.

16

3.4 Enter FMS Mode - #FMS command

The #FMS command will switch the main state to Operation mode (FMS mode) where the CANGO FMS interface will start sending serial protocol data.

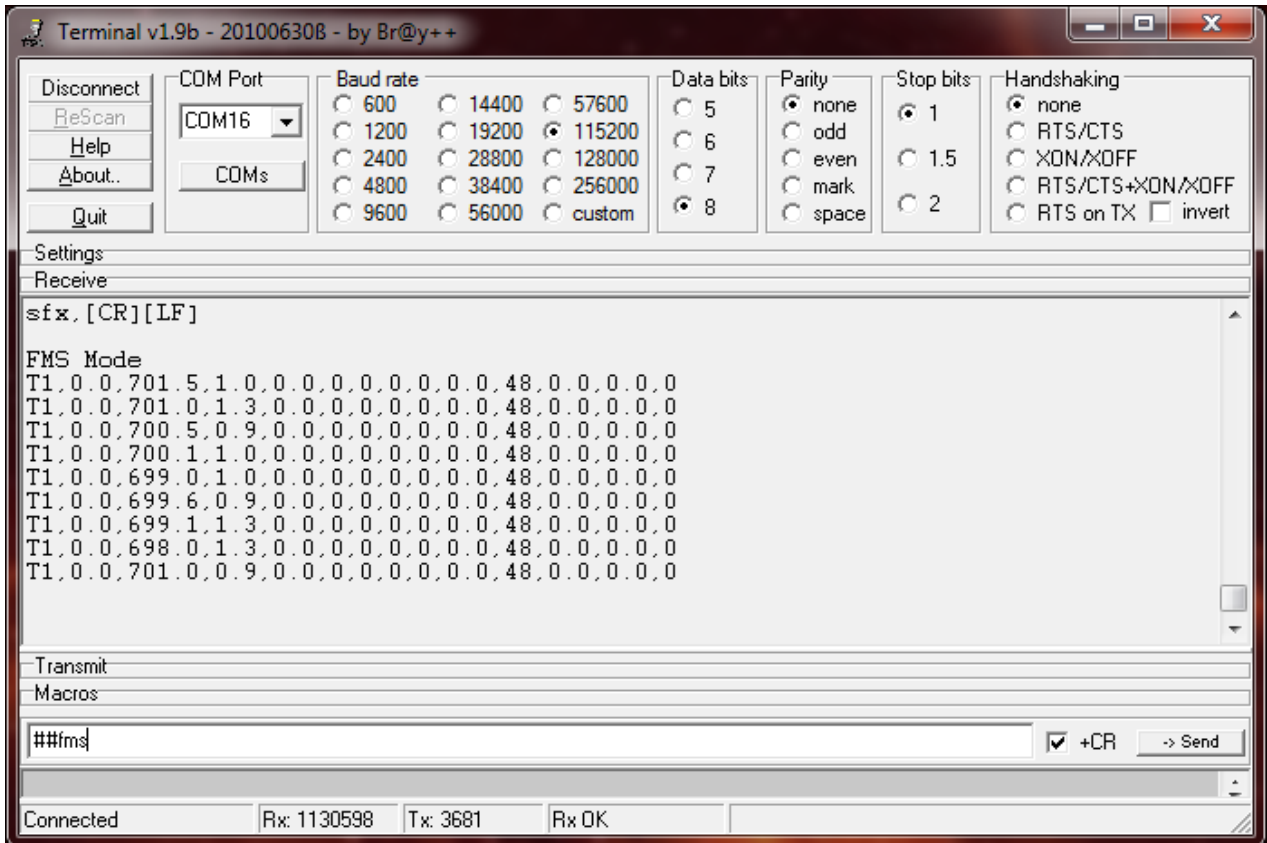| Command	Description
#FMS[CR][LF]	The command syntax. Only one of the answers will be returned
FMS Mode[CR][LF]	Confirmation: The confirmation answer
Error[CR][LF]	Error: In case of syntax error

Table 20 - Example of #FMS command and the possible answers.

Fig 5 - Example of #fms command, using the Terminal software.

3.5 UART baud rate - #sbaud command

The #sbaud command sets the baud rate of the serial link. The baud rate will be switched after restart, if configuration was saved, otherwise the old baud rate will remain active.

Log	Description
#sbaud,*baud*[CR][LF]	Set the baud rate. The valid values for the serial baudrate are the following: 2400, 4800, 9600, 19200, 38400, 57600 or 115200 (default). Only one of the next answers will be returned.
sbaud,*baud*[CR][LF]	Confirmation: The confirmation answer will look like the command, without the # character.
Error, not supported baudrate[CR][LF]	Error: The answer if the baud rate is not supported
Error[CR][LF]	Error: The answer in case of syntax error

Table 21 - Example of #sbaud command and possible answers.
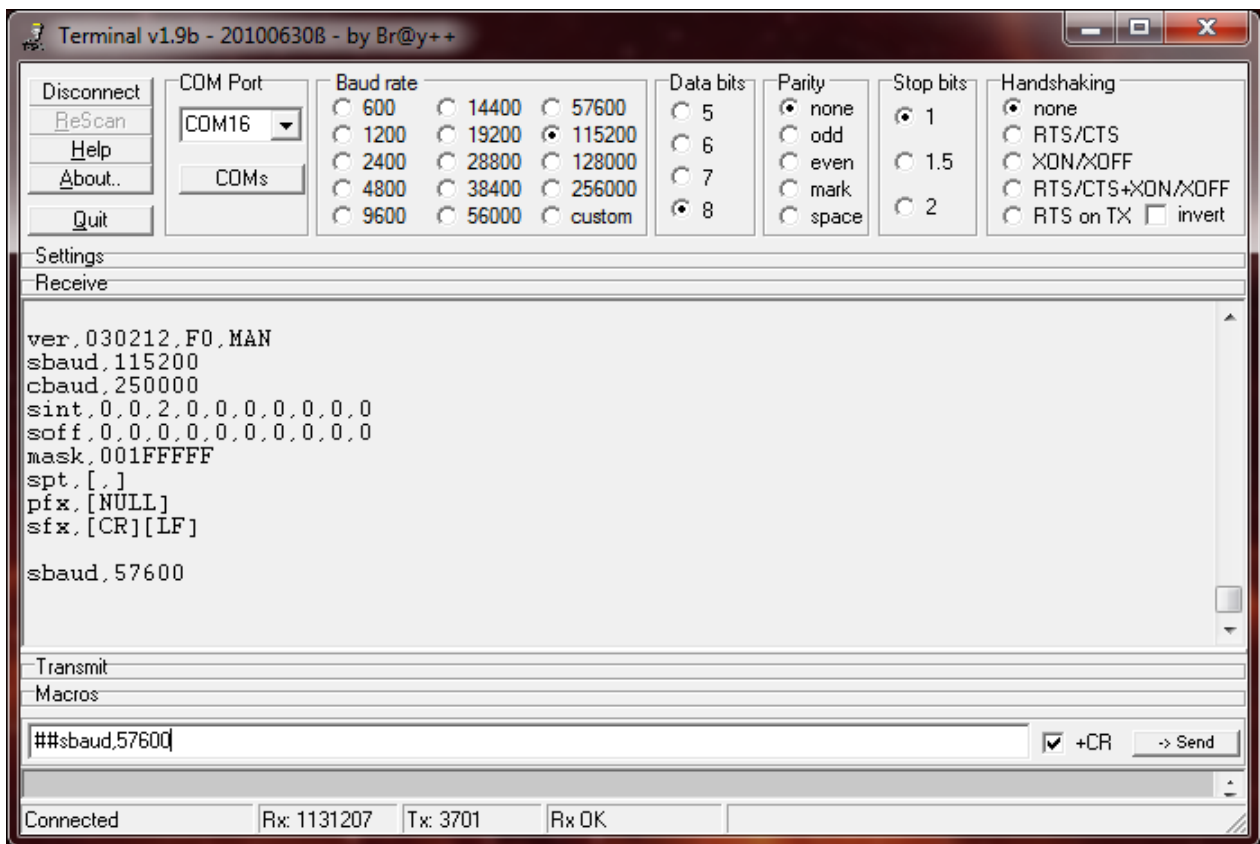
Fig 6 - Example for #sbaud command, using Terminal.

3.6   CAN baud rate - #cbaud command

The #cbaud command sets the listen CAN baud rate, on CANbus1 and CANbus2. The baud rate will be switched after restart, if configuration was saved, otherwise the old baud rate will remain active.

Log	Description
#cbaud,*baud*[CR][LF]	Set the baud rate. The valid values for the CAN baudrate are the following: 33300, 50000, 83300, 100000, 125000, 250000 (default), 500000 or 1000000. Only one of the next answers will be returned.
cbaud,*baud*[CR][LF]	Confirmation: The confirmation answer will look like the command, without the # character.
Error, not supported baudrate[CR][LF]	Error: The answer if the baud rate is not supported
Error[CR][LF]	Error: The answer in case of syntax error

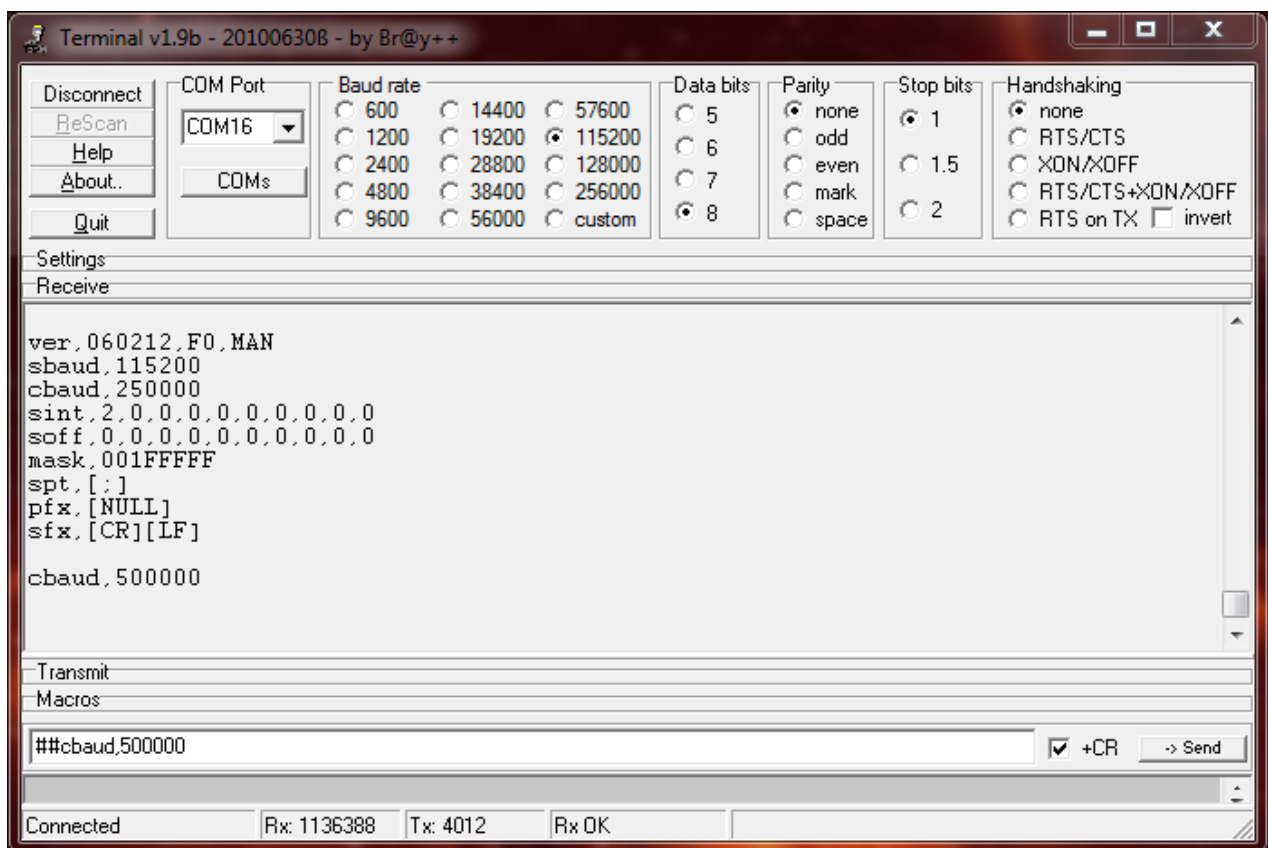*Table 22 - Example of #cbaud command and possible answers.*

Fig 7 - Example of #cbaud command, using Terminal.

3.7 Serial frame repeat interval - #sint command

The #sint command will set the repeat time interval for each serial frame. The command accepts up to 10 comma separated values between 0 (the frame will not be sent) and 65535 seconds. Each value corresponds to one single serial frame (see Table 23). By default, the Readable Table frame will be the only one broadcasted every 2 seconds. An example of timing diagram you can see at page 7.

1	2	3	4	5	6	7	8	9	10
Readable Table	Spreadsheet	T1 Frame	T2 Frame	T5 Frame	T6 Frame	(reserved)			

Table 23 - Serial frames.

Log	Description
#sint,*i,k,m,x,z*[CR][LF]	Set the repeat time interval *i,k,m,x,z* seconds for the corresponding frames (see Table 23). To set one specific single time interval the preceding values are required, but none of the following. Example: set T1 broadcast at 2 sec (see fig 8).
sint,*i,k,m,x,z*[CR][LF]	Confirmation: The confirmation answer will look like the command, without the # character.
Error[CR][LF]	Error: In case of syntax error

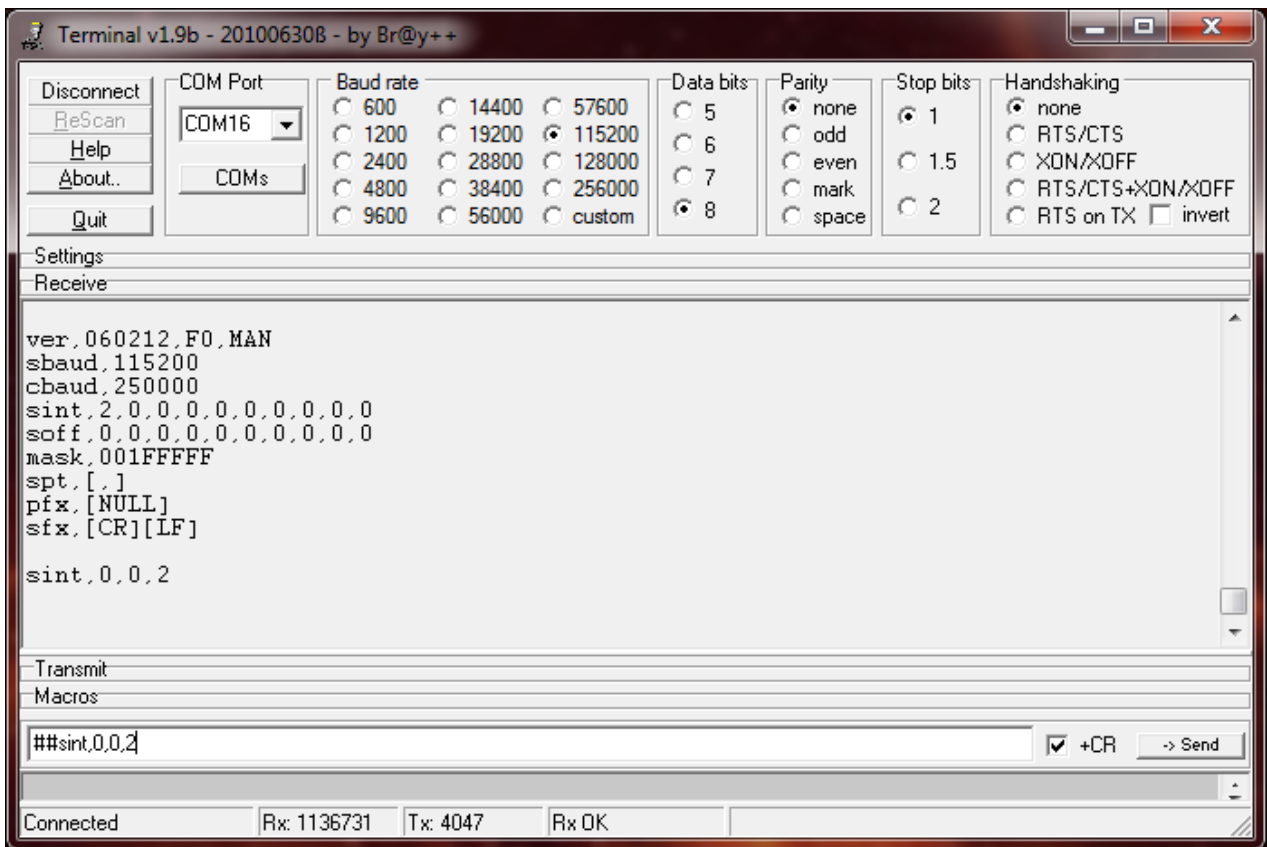*Table 24 - Example of #sint command and possible answers.*

Fig 8 - Example of #sint command, using Terminal.

3.8 Serial frame offset broadcast time

The #soff command will set the offset time for each serial frame. The command accepts up to 10 comma separated values between 0 and 65535 seconds. Each value corresponds for one single serial frame (see Table 23) and represents the time elapsed from start-up to the first send. You can see an example of timing diagram at page 7.

Log	Description
#soff,*i,k,m,x,z*[CR][LF]	Set the offset time at *i,k,m,x,z* seconds for the corresponding frames (see Table 23). To set one specific single offset time the preceding values are required but none of the following.
soff,*i,k,m,x,z*[CR][LF]	Confirmation: The confirmation answer will look like the command, without the # character.
Error[CR][LF]	Error: In case of syntax error

Table 25 - Example of #soff command and possible answers.
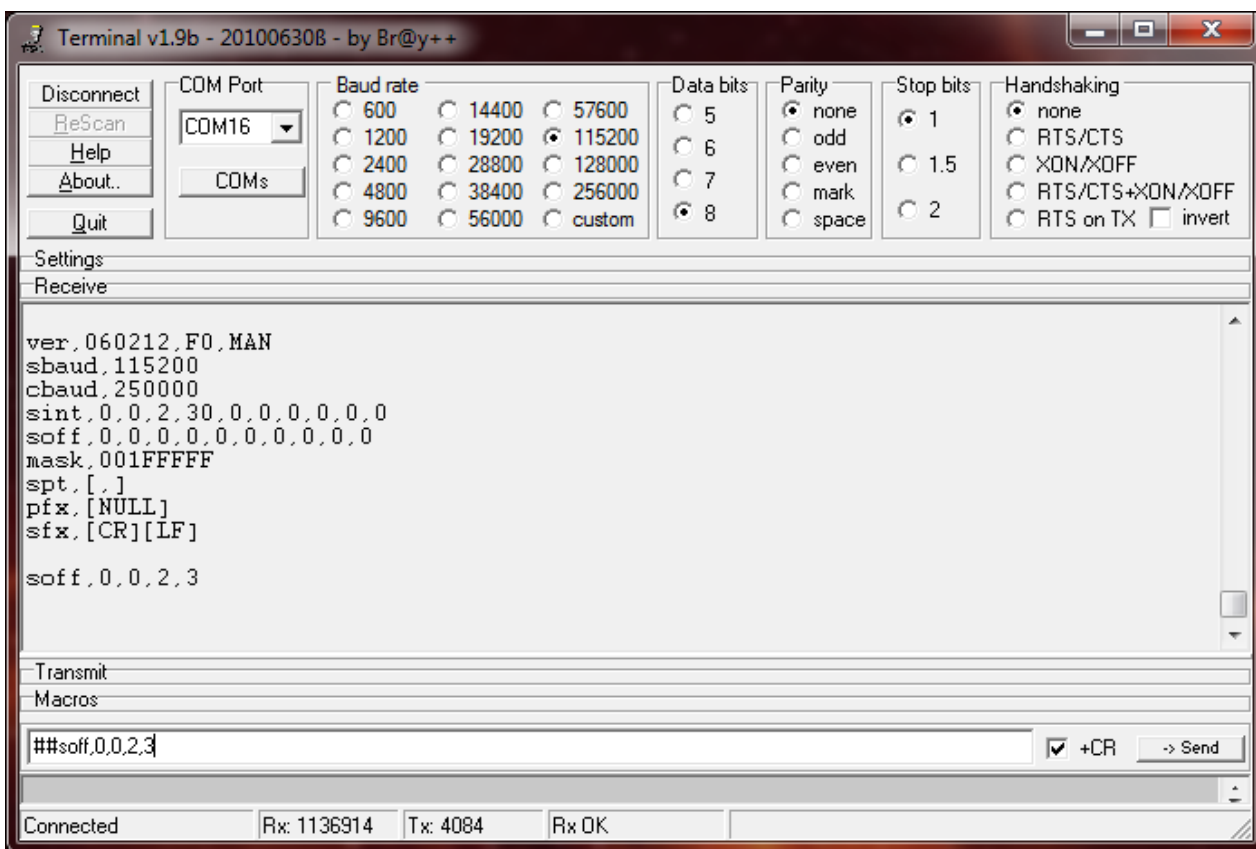

Fig 9 - Example of #soff command, using Terminal.

21

3.9 Mask for output values - #mask command

The #mask command sets the mask for the FMS messages involved in output values. Acceptable parameter range is between 00000001 and 001FFFFF. Value has to be entered in hexadecimal notation. The mask will be applied only for spreadsheet frame and Readable Table serial frames. By default the mask is set to 001FFFFF value.

Log	Description
#mask,*mask*[CR][LF]	Set the *mask* for output values
mask,*mask*[CR][LF]	Confirmation: The confirmation answer will look like the command, without the # character.
Error[CR][LF]	Error: In case of syntax error

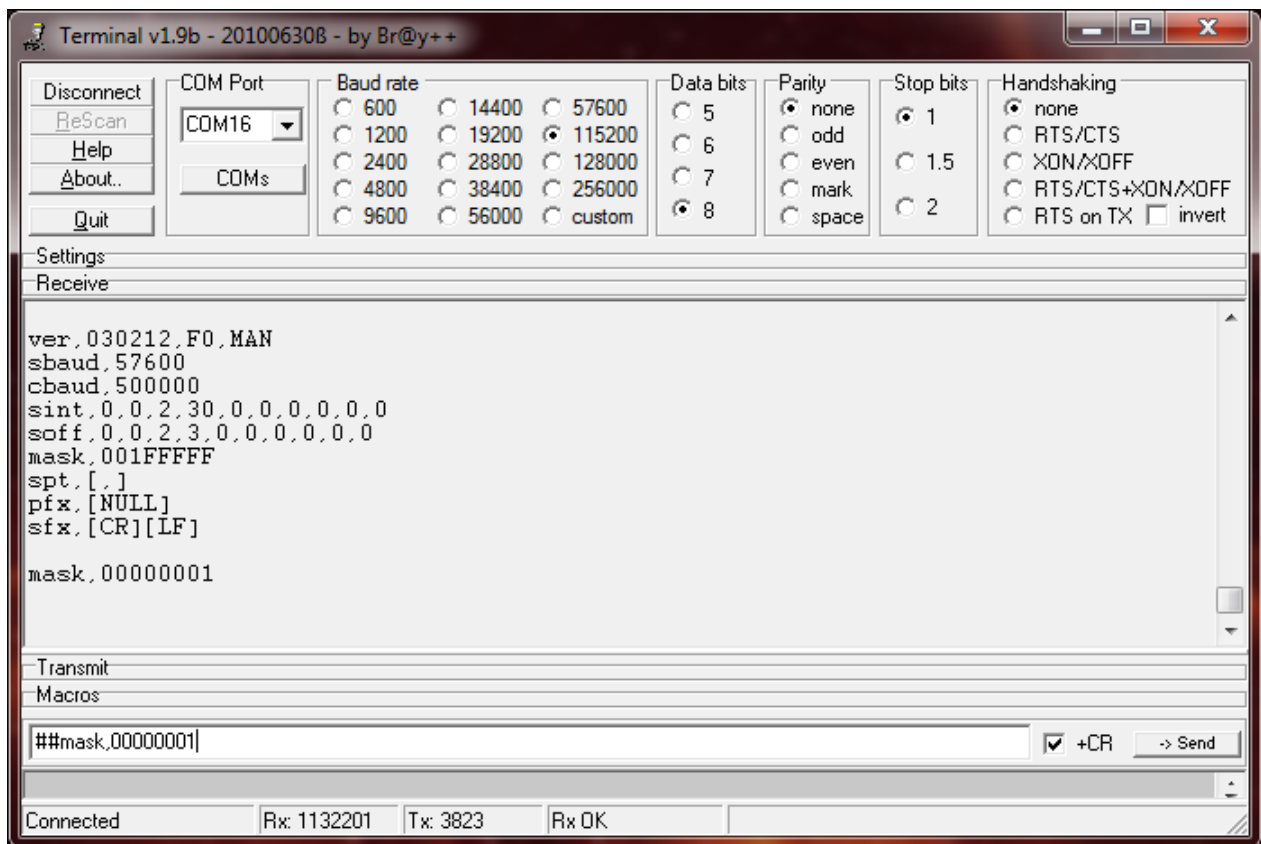*Table 26 - Example of #mask command and possible answers.*

Fig 10 – Example of #mask command, using Terminal.

In the mask register the bits related to the desired output parameters has to be set to '1'. If a value should not appear in the output, the related bit has to be set to '0'.

When CANGO has 001FFFFF value, all parameters are enabled for output.

Bit	J1939/FMS	J1708/J1587	K-Line	J2284 (Renault)
0	Engine Speed	Engine Speed	Engine Speed	Engine Speed
1	Acc. pedal & Engine Load	Acc. pedal & Engine Load	Not defined[11]	Acc. pedal & Engine Load
2	TCO	Not defined	Not defined	Not defined
3	CCVS	Wheel Based Speed	Vehicle Speed	Vehicle Speed
4	Service Distance	Not defined	Not defined	Service Distance
5	Vehicle Distance	Vehicle Distance	Vehicle Distance	Vehicle Distance
6	Engine Hours	Engine Hours	Engine Hours	Engine Hours
7	Fuel Consumption	Fuel Consumption	Fuel Consumption	Fuel Consumption
8	Vehicle Weight	Not defined	Not defined	Not defined
9	Engine temp	Engine temp	Engine temp	Engine temp
10	Fuel Level	Fuel Level	Not defined	Fuel Level
11	Vehicle ID	Not defined	Vehicle ID	Vehicle ID
12	Ambient Temp	Not defined	Not defined	Not defined
13	Driver ID	Not defined	Not defined	Not defined
14	Fuel Economy, Fuel Rate	Not defined	Not defined	Not defined
15	PTO Engagement	Not defined	Not defined	Not defined
16	Total Fuel High Resolution	Not defined	Not defined	Not defined
17	Reserved	Reserved	Reserved	Reserved
18	Reserved	Reserved	Reserved	Reserved
19	Reserved	Reserved	Reserved	Reserved
20	Reserved	Reserved	Reserved	Reserved
21	Reserved	Reserved	Reserved	Reserved
22	Reserved	Reserved	Reserved	Reserved
23	Reserved	Reserved	Reserved	Reserved

Table 27 - Bits for mask register.

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[11] *'reserved' and 'not defined' bits has to be set to '0''*

3.10 Setting the field separator[12] character for the spreadsheet and frame format - #spt command

The #spt command will set the field separator character for the spreadsheet and for the frame format. CANGO FMS interfaceis being delivered with the "," (comma) field separator pre-programmed.

Log	Description
#spt,*separator*[CR][LF]	Set the field separator character
spt,*separator*[CR][LF]	Confirmation: The confirmation answer will look like the command, without the # character.
Error[CR][LF]	Error: The answer in case of syntax error

Table 28 - Example of #spt command and possible answers.

To use hexadecimal characters in the desired ASCII separator, you should use the following format: **%XX**, where **XX** is the desired hex byte. If you need **%** (ASCII % character), then double it: **%%.**
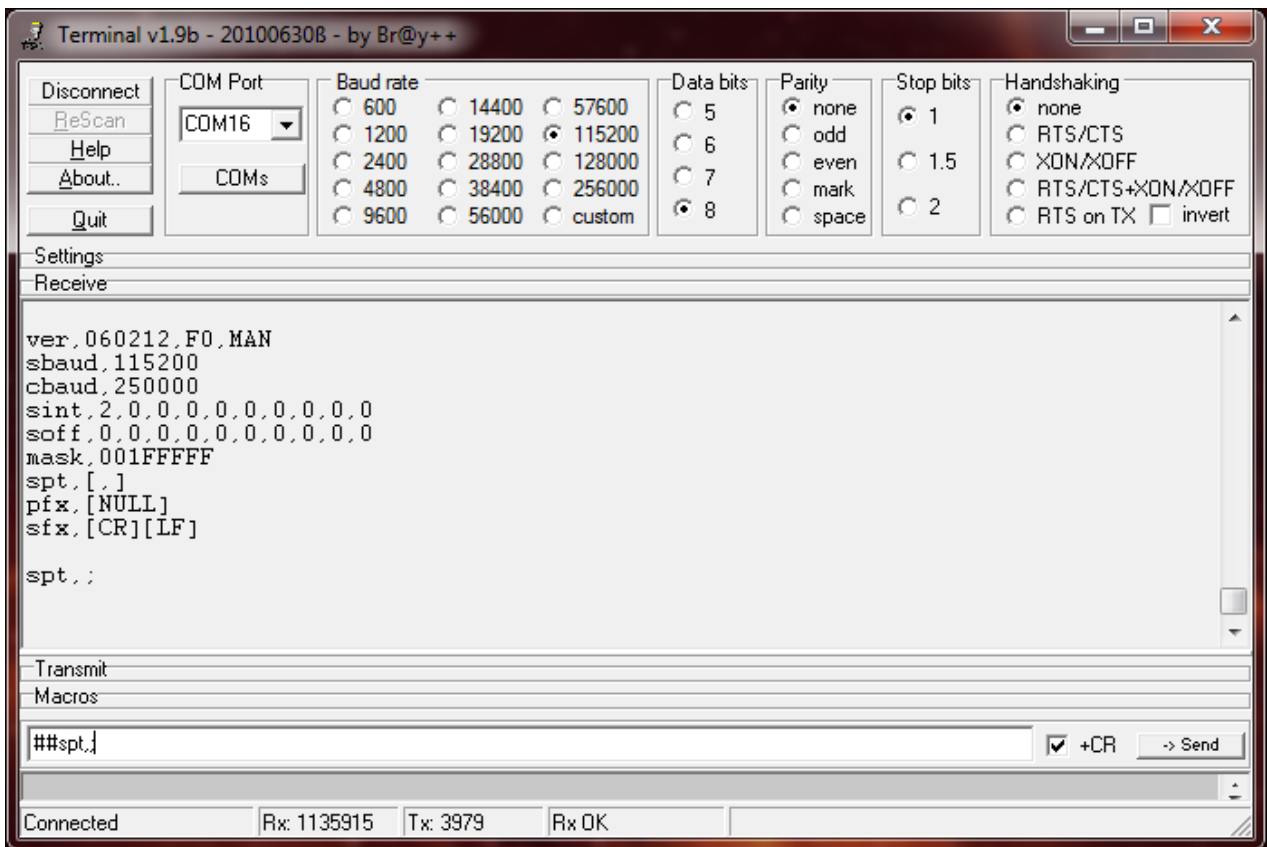

Fig 11 - Example of #spt command, using Terminal[13].

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[12] *Prefix, suffix and field separator are used and showed in the actual configuration for spreadsheet, T1, T2, T5 frames and not for readable frame.*

[13] *In Terminal for special characters **#, $, <** , you have to double type them.*

3.11 Setting the prefix[14] for the spreadsheet and frame format - #pfx command

The #pfx command is used to set the prefix used in the spreadsheet screen format or frame format. CANGO FMS interfaceis being delivered **with no prefix** pre-programmed (not a single byte).

Log	Description
#pfx,*prefix*[CR][LF]	Set the *prefix*
Pfx,*prefix*[CR][LF]	Confirmation: The confirmation answer will look like the command, without the # character.
Error[CR][LF]	Error: The answer in case of syntax error

Table 29 - Example of #pfx command and possible answers.

To use hexadecimal characters in the desired ASCII prefix, you should use the following format: **%XX**, where **XX** is the desired hex byte. If you need **%** (ASCII % character), then double it: **%%.**

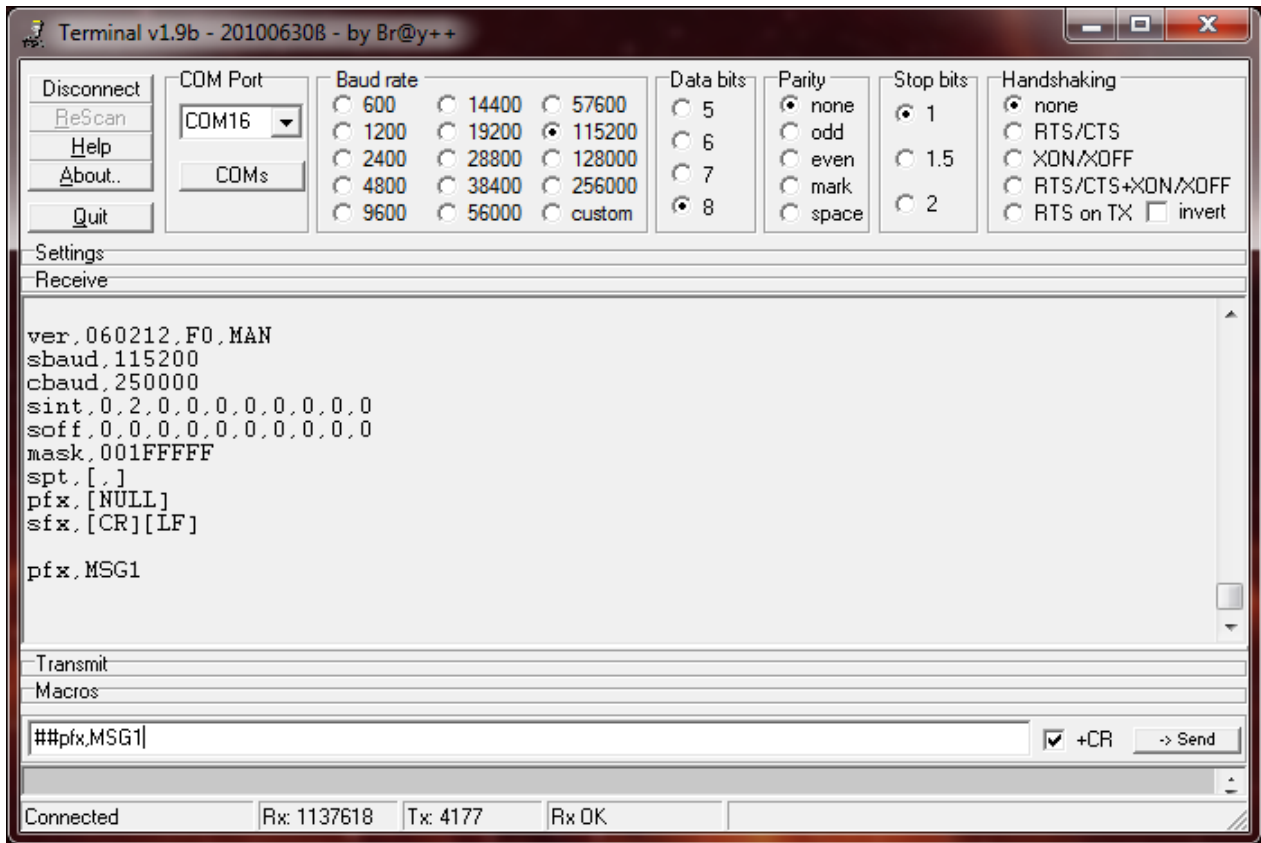Example setting *MSG1* prefix:

Fig 12 - Example of #pfx command, using Terminal[15].

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[14] *Prefix, suffix and field separator are used and showed in the actual configuration for spreadsheet, T1, T2, T5 frames and not for readable frame.*

[15] *In Terminal for special characters **#, $, <** , you have to double type them.*

3.12 Setting the suffix[16] for the spreadsheet and frame format - #sfx command

The #sfx command sets in the suffix used in the spreadsheet format or frame format. CANGO FMS interfaceis being delivered with the *[CR][LF]* suffix pre-programmed.

Log	Description
#sfx,*suffix*[CR][LF]	Set the *suffix*.
sfx,*suffix*[CR][LF]	Confirmation: The confirmation answer will look like the command, without the # character.
Error[CR][LF]	Error: The answer in case of syntax error

Table 30 - Example of #sfx command and possible answers.

To use hexadecimal characters in the desired ASCII suffix, you should use the following format: **%XX**, where **XX** is the desired hex byte. If you need **%** (ASCII % character), then double it: **%%.**
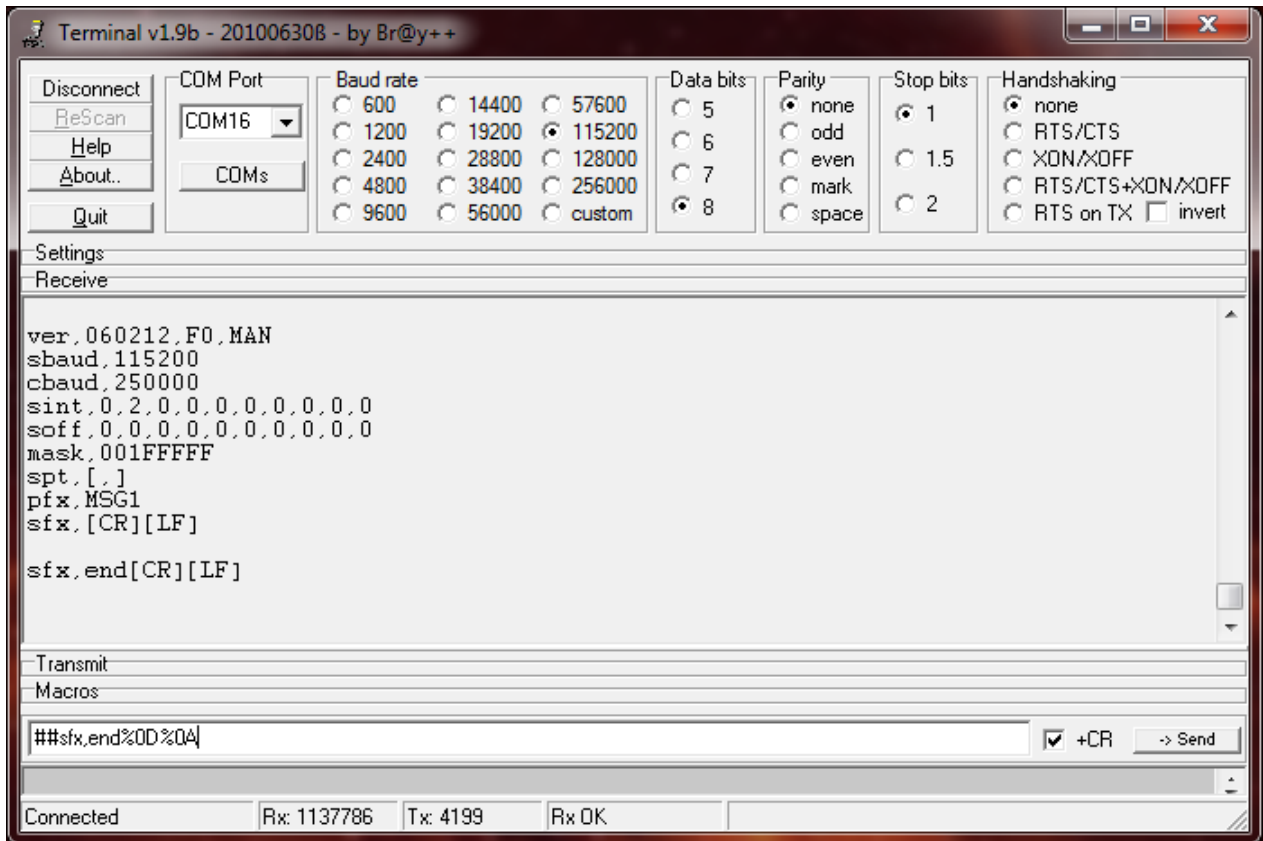Example setting *end[CR][LF]* suffix:

Fig 13 - Example of #sfx command, using Terminal[17].

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[16] *Prefix, suffix and field separator are used and showed in the actual configuration for spreadsheet, T1, T2, T5 frames and not for readable frame.*

[17] *In Terminal for special characters **#, $, <** , you have to double type them.*

3.13 Save configuration - #save command

The #save command will save the current configuration to permanent memory, to be held after reset. All changed settings will be lost if Save Command is not used before reset.

Log	Description
#save[CR][LF]	Will save the current configuration in permanent memory
Configuration saved, reset to apply [CR][LF]	Confirmation: The confirmation answer
Error[CR][LF]	Error: In case of syntax error

Table 31 - Example of #save command and possible answers.

3.14 Discard configuration - #discard command

The #discard command will revert actual configuration to the last saved state. This command is useful when you made a mistake in your configuration and want to revert.

Log	Description
#discard[CR][LF]	The configuration was reverted to the last saved state
Configuration discarded[CR][LF]	Confirmation: The confirmation answer
Error[CR][LF]	Error: In case of syntax error

Table 32 - Example of #discard command and possible commands.

3.15 Reset - #reset command

The #reset command will reset the CANGO Telematic Interface. At startup the configuration will be loaded from permanent memory. Use this command to apply the settings before save.

Example of the command:

Log	Description
#reset[CR][LF]	The device will be reset
booting...[CR][LF]	Confirmation: The confirmation answer. Means that the device was restarted and now it is in startup
Error[CR][LF]	Error: In case of syntax error

Table 33 - Example of #reset command and possible answers.