



BT1200i interpreter module for passenger car

All cars built since January 1, 1996 have OBD-II systems. Manufacturers started incorporating OBD-II in various models as early as 1994. OBDII /EOBD is an international standard for communication between automobiles and diagnostic testers. it specifies a serial data communication bus between ECUs and diagnostic test SAE OBDII Scan Tool (SAE j1978). The BT1200i provides an intelligent interface between a Host and the vehicle's Electronic control units. It compatible with the PC version of the diagnostic software and Android diagnostic APP.

Features

- Compatible with OBDII / EOBD standard.
- Power voltage monitoring.
- Direct LED drive for status display.
- Supports:
ISO 15765-4 CAN (500K/250K, 11bits/29bits),ISO9141,KWP2000,J1850
PWM,J1850 VPW,TOYOTA,NISSAN CAN,BMW,VOLVO,SAAB,SUBARU,
Lexus,...etc, over 20 protocols.
- Configurable via AT command.
- Packet message.
- Automatically searches for protocols.

1. Major hardware features of BT1200i Interpreter are listed below:

- Compact size (mm): : 87.0 x 59.2 x 18.5 mm
- Operating temperature: -10 °C to 70 °C
- Storage temperature: -40 °C to 150°C
- Power supply: +9V~+16 V DC, 80mA max
- 2 LED indicators:
 - Red LED: for power and learning indicator
 - Blue LED: for Bluetooth work indicator
- 1 Reset button: Not used in normal operation, used for RESET memory only.
- Bluetooth Interface: baud rate 9600, 8,N,1.

2. Communicating with the BT1200i

The BT1200i communicate with your device through a Bluetooth Serial Port Profile (SPP). You need use one COM port monitor program to send and receive data. To use a terminal program, you will need to make several settings.

- 1.) Setting proper "COM" port, data rate is 9600.
- 2.) Setting your connection for 8 data bits, no parity bits, and 1 stop bit.
- 3.) Setting 'LINE END' mode.

Properly connected and powered, the BT1200i will print the message:

```
BT1200i vxx.yy
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>
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vxx.yy is version number. The '>' character that is shown on the second line is the BT1200i's prompt character. It indicates that the device is in the idle state, ready to receive characters on the SPP. If you see strange looking characters, then check your baud rate, you have likely set it incorrectly. If you did not see the identification string, you might try resetting the Interpreter again with the ATZ (reset) command. Simply type the letters A T and Z (spaces are optional), then press the return key:

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>AT Z
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If you type HEX code, it will be "41","54","5A","0D", as ASCII code "A", its HEX code is "41". The commands 'ATZ', 'atz', and 'AtZ' are all exactly the same to the BT1200i.

The BT1200i has two function modes:

- (1) Scan Tool Mode (STM): It is compatible with commercial scan tool software.
- (2) Packet Message Mode(PMM): Auto send packet message.

The default is Packet Message Mode. ATZ command can swift PMM to STM.

Once BT1200i enter STM, it will print identify ID:

ELMA BT1200i vxx.x.yymmdd

If you send a incorrect command the BT1200i will print a single question mark ('?') to show that the input was not understood, in case it failed to communicate to OBDII, BT1200i will print

E R R O R

>

Once BT1200i connect to OBDII, the RED LED lit every second and it starts to try protocol, once BT1200i correctly communicates with car ECU, it will display

Connection Success

>

and it will auto send Packet Message out. Next time BT1200i only try the successful protocol unless use ATR to reset it.

In case BT1200i has not connected to OBDII, the AT*h command is no use, BT1200i will print

NO DATA

>

The AT command sent timing interval, it is recommended

CAN BUS : >50 ms.

J1850: >100 ms

others >200 ms

If BT1200i can not receive data response it will print NO DATA. After trying 180 seconds, in case the BT1200i can not find correct protocol, it will enter sleeping mode.

BT1200i provides broadcast mode and Scan Mode, the BT1200i default is Broadcast Mode.

- Broadcast Mode: Auto Send packet format data every 100~200 ms. **BY HEX CODE**. Available command : ATT,ATS,ATX,ATFL.
- Scan Mode: Support AT command and PID request data. It will switch back to broadcast mode if idle over 30 seconds. To use **09FF<cr>** Command or **ATS<cr>** can switch to Broadcast mode directly.

3. AT Command Summary

@1	Display software version EX: AT@1 <cr> BT1200i V32.3.120918 >
ATBS	<p>Function : to BLD(bootloader) for FW update with ATBS command</p> <ol style="list-style-type: none"> 1.Under Bootload mode, OBD module(BT dongle) echoes"BLD"continually and waits a command. 2.For BT dongle, LEDs start to flash alternatively in 1Hz. 3.If no legal command received OBD module(BT dongle) leave Bootload mode when time out (~3 minutes) and go back to normal working mode. <p>Bootload commands : (9600,n,8,1)</p> <ol style="list-style-type: none"> 1.Request current firmware version : send a'?' to OBD module(BT dongle), OBD module(BT dongle) echo firmware version: ex.'" 331121218"'. 2.Firmware upgrade: write new firmware file to OBD module(dongle) line by line. 3.OBD module(BT dongle) echoes ACK(\0x06) when single line write success, NAK(\0x15) when fail. If fail, re-send that line again. 4.After write first line to OBD module(BT dongle), OBD module(BT dongle) will be forced to stay in Bootload mode until the file end line(:00000001FF) had send to OBD module(BT dongle) successfully. 5.Power off(outage) would not change operating mode, OBD module(BT dongle) will stay in Bootload mode when re-boot. And it is suggested to re-start the upgrade process (write begin form 1'st line). 6. Press reset key of BT dongle when power on, will force BT dongle go into Bootload mode. <p>7. Firmware file example:</p> <p>File name: abc.bin</p> <pre>:FB1DA99E735253AD5D5223E2F1E9E6F9D3C06E5F6AF0939D818F39 F360DCEB3236EF7EE0BA75E6915E21D12606E71145DD508240668775 C3F56108552D2A2A0F2F6C4FC322F6 :146E7F76B7949AA4D9DCA5C5E7E2886CF5DCB3F830261534680591 DBE30F722FC6E18DA996648B1DD914F6958203BE597470B34F0268A9 70F0CDF77E20E8CB9002C9078C2452 :00000001FF</pre>

	<p>Description:</p> <p>Format of a line:</p> <pre>:FB1D ...C322F6\x0d\x0a <-68 chars-> <-2 chars chksum 22F6=FB+1D+ .+C3</pre> <p>Each line leading with ':' end with \n :00000001FF means end of file</p>
BV	<p>Display Battery Voltage:</p> <p>EX: ATBV <cr></p> <pre>12.5 ></pre>
DPN	<p>Display protocol number, BT1200i returns a number which represents the current protocol. Please refer to ATSPxy list.</p> <p>EX: ATDPN <cr></p> <pre>06 ></pre>
Ex	<p>ATE0: Echo Off , ATE1: Echo On</p> <p>These commands control whether or not the characters received on the SPP are echoed (retransmitted) back to the host computer. Character echo can be used to confirm that the characters sent to the BT1200i were received correctly. The default is E1 (or echo on).</p>
FL	<p>Fuel Level (0~100%)</p>
H	<p>ATH0: Headers Off , ATH1: Headers On</p> <p>These commands control whether or not the additional (header) bytes of information are shown in the responses from the vehicle. These are normally not shown by the BT1200i, but can be turned on by issuing the AT H1 command. Turning the headers on, you will see the complete message as transmitted.</p>
I	<p>Print Identify message, it will be "ELMA BT1200i vxx.x"</p>
R	<p>Clear protocol. ATR command clear current protocol then continue learning next new protocol.</p>

S	Auto- send data		
	There are tow Packet Message:		
	(5) Normal message:		
	Field	Character	HEX
	Byte 0	@	40
	Byte 1	N	4E
	Byte 2		V
	Byte 3		V
	Byte 4		V
	Byte 5		V
	Byte 6		V
	Byte 7		A
	Byte 8		B
	Byte 9		V
	Byte 10		V
	Byte 11		V
	Byte 12		V
	Byte 13		V
	Byte 14		CS
	Byte 15		CS2
Description			
Start			
Normal			
Fuel System Status, Bit encoded=V, NOTE 1			
Calculated Engine Load(CEL) value value = V*100/255 (0~100%)			
Engine Coolant Temperature(ECT) (ECT) =V-40 (-40~215°C)			
Fuel Pressure (FP)0~765 kPa (gauge) =V*3			
Intake Manifold Pressure (IMP) = V (0~255 kPa)			
RPM: high byte			
RPM: low byte Engine RPM=A*256+B			
Vehicle Speed (VS)=V (0~255 km/h)			
Intake Air Temperature (IAT) =V-40 (-40~215 °C)			
Air Flow Rate (MAF) =V g/s			
Throttle Position (TP) =V *100/255 (0~100 %)			
Battery voltage= V/10 (volt)			
Check Sum, NOTE 2			
Check Sum, NOTE 2			

Byte 16	LF	0A	LF
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NOTE1:

Bit 0: Open loop due to insufficient engine temperature

Bit 1: Closed loop, using oxygen sensor feedback to determine fuel mix.

Bit 2: Open loop due to engine load OR fuel cut due to deacceleration

Bit 3: Open loop due to system failure

Bit 4: Closed loop, using at least one oxygen sensor but there is a fault in the feedback system.

Bit5-Bit7 : Always zero

NOTE 2:

CS= Byte1+Byte2 +....Byte 13.

CS2=CS+Byte3

Example:

One data packet:

40,4E, 14, 50, 56 ,2C, 01,09,58, 2B, AC, 57, 20, 87,CS, CS2, 0A

- Check Sum (CS)= 4E+14+50+ 56+2C+ 01+ 09+58+ 2B+ AC+ 57+ 20+ 87 =6B
- CS2=CS+ CS=6B+Byte3=BB (hex)
- RPM= high byte 09 (hex), low byte 58 (hex), RPM=958 (hex)=2391
- Battery voltage= 135(87 hex)/10=13.5 V
- Engine Coolant Temperature=86 (56 hex) – 40=46
- Fuel System Status: 14=00010100

Bit2=1, Open loop due to engine load OR fuel cut due to deacceleration

Bit4=1, Closed loop, using at least one oxygen sensor but there is a fault in the feedback system.

(2) Malfunction Data Format:

When a trouble code occurs, send the data every 10 seconds.

Field	Character	HEX	Description
Byte 0	@	40	Start
Byte 1	M	4D	Malfunction
Byte 2		U1	Trouble Code= U1U2 Assume U1=12,U2=34, Trouble code=1234
Byte 3		U2	
Byte 4		V1	Trouble Code= V1V2 Assume v1=56, V2=78, Trouble code=5678
Byte 5		V2	
Byte 6		W1	Trouble Code= W1W2 Assume W1=01, W2=13, Trouble code=0112
Byte 7		W2	
Byte 8		X1	Trouble Code= X1X2 Assume X1=02, X2=34, Trouble code=0234
Byte 9		X2	
Byte 10		Y1	Trouble Code= Y1Y2 If Y1=86, Y2=79, Trouble code=8679
Byte 11		Y2	
Byte 12		00	
Byte 13		00	
Byte 14		CS	Check Sum, NOTE 2
Byte 15		CS2	Check Sum, =CS+CS
Byte 16	LF	0A	LF

Example:

One data package:

40, 4D, 12, 34, 56, 78, 01, 12, 02, 34, 86, 79, 00, 00, CS, CS2, 0A

$CS = 4D + 12 + 34 + 56 + 78 + 01 + 12 + 02 + 34 + 86 + 79 + 00 + 00 = A9$

$CS2 = CS + CS = A9 + A9 = 52$

If the first hex digit received is this,
Replace it with these two characters

0	P0	Powertrain Codes - SAE defined
1	P1	" " - manufacturer defined
2	P2	" " - SAE defined
3	P3	" " - jointly defined
4	C0	Chassis Codes - SAE defined
5	C1	" " - manufacturer defined
6	C2	" " - manufacturer defined
7	C3	" " - reserved for future
8	B0	Body Codes - SAE defined
9	B1	" " - manufacturer defined
A	B2	" " - manufacturer defined
B	B3	" " - reserved for future
C	U0	Network Codes - SAE defined
D	U1	" " - manufacturer defined
E	U2	" " - manufacturer defined
F	U3	" " - reserved for future

Trouble Code: 1234, the first HEX digit is 1, the trouble code will be P1234
5678, the first HEX digit is 5, the trouble code will be C1678

SPxy	<p>Set Protocol to xy. Xy is decimal.</p> <p>This command is used to set the BT1200i for operation using the protocol specified by 'xy'.</p> <p>'ATSP09' and 'ATSP9' are the same.</p> <p>The currently valid protocols are:</p> <ul style="list-style-type: none"> 0 – Automatic 1 – SAE J1850 PWM 2 – SAE J1850 VPW 3 – ISO 9141-2 4 – ISO 14230-4 KWP 5 – ISO 14230-4 KWP (fast) 6 – ISO 15765-4 CAN (11 bit ID, 500 K) 7 – ISO 15765-4 CAN (29 bit ID, 500 K) 8 – ISO 15765-4 CAN (11 bit ID, 250 K) 9 – ISO 15765-4 CAN (29 bit ID, 250 K) 10 – Nissan CAN 11 – SUZUKI 12 – ISO 14230D 13 – ISO 14230A 14 – ISO 14230E 15 – ISO 14230F 16 – ISO 14230B 17 – TOYOTA 18 – TOYOTA CAN (JP) 19 – PROTON (SARVY) 20 – TOYOTA (Comfort) 21 – Renault (MEGANE) 22 – PROTON GEN2 23 – ISO14230G (Citroen) 24 – FUSO (3.5T) 25 – Hyundai (old) 26 – Subaru CAN 27 – Subaru CAN (2010~) 28 - Renault CAN 29 - Subaru -K <p>Some commercial scan tool APPs just support #1~ #9.</p> <p>The max value of xy is 27, if it is over 27, xy will be set as 0 and BT1200i will print " SEARCHING... " message.</p>
SM	Keep BT1200i in Scan Tool Mode (STM)

T	Terminate sending.
X	Send one package data, data format as ATS command.
Z	In Case of BT1200i is in learning protocol, the command will reset BT1200i.

4. SAE standard J/1979 PID request data:

You can use SAE standard MODE & PID to request data if device is connection successful.

EX: request engine coolant temperature, coolant temperature is PID 05 of MODE 01, and can be requested as follows:

> 01 05

The response will be of the form:

41 05 7A

7A is temperature data, detail spec please refer to the SAE OBD-II PIDs standard

EX 2: request **Vehicle Identification Number**, PID 02 of MODE 09, and can be requested as follows:

> 09 02

the response will be of the form:

V: VIN

The VIN is 17 bytes of ASCII code. There are at least four competing standards used to calculate VIN.

- FMVSS 115, Part 565: Used in United States and Canada
- ISO Standard 3779: Used in Europe and many other parts of the world
- SAE J853: Very similar to the ISO standard
- ADR 61/2 used in Australia, referring back to ISO 3779 and 3780

NOTE:

5. Protocols (#10, #11, #15, #16, #19, #21, #24, #26, #27) do not support Scan Mode, others protocol support SAE standard MODE & PID to request data. If the BT1200i is connected to OBD2 success and only Blue flashing, it means you can not use Scan Mode at this vehicle.

5. The AT command sent timing interval, it is recommended

CAN BUS : >50 ms.

J1850: >100 ms

others >200 ms

if BT1200i can not receive data response it will print NO DATA.

5. The 0902 command will print the format V:VIN, it is only applied to BT1200i

software after R32.3 version.

5. Reversion History

Rev	Date	History	Note
R5	20130627	Add “ ATBS ” Command	to BLD(bootloader) for FW update with ATBS command
R6	20130702	Add AT command sent timing interval, it is recommended	Page3 、 11