NEXCOM International Co., Ltd.

Mobile Computing Solutions

Vehicle Telematics Computer

VTC 100

User Manual

NEXCOM International Co., Ltd.
Published March 2014

www.nexcom.com

Contents

Chapter 3: System Setup

Appendix A: CAN Module Setup and Command..31

Preface

Copyright

Disclaimer

The information in this document is subject to change without prior notice and does not represent commitment from NEXCOM International Co., Ltd. However, users may update their knowledge of any product in use by constantly checking its manual posted on our website: http://www.nexcom.com. NEXCOM shall not be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of any product, nor for any infringements upon the rights of third parties, which may result from such use. Any implied warranties of merchantability or fitness for any particular purpose is also disclaimed.

Acknowledgements

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

RoHS Compliance

NEXCOM RoHS Environmental Policy and Status Update

NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2002/95/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NEXCOM has established an engineering and manufacturing task force in to implement the introduction of green products. The task force will ensure that we follow the standard NEXCOM development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NEXCOM are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

How to recognize NEXCOM RoHS Products?

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2006 will be RoHS compliant. They will use the usual NEXCOM naming convention.

Warranty and RMA

NEXCOM Warranty Period

NEXCOM manufactures products that are new or equivalent to new in accordance with industry standard. NEXCOM warrants that products will be free from defect in material and workmanship for 2 years, beginning on the date of invoice by NEXCOM. HCP series products (Blade Server) which are manufactured by NEXCOM are covered by a three year warranty period.

NEXCOM Return Merchandise Authorization (RMA)

- Customers shall enclose the "NEXCOM RMA Service Form" with the returned packages.
- Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the "NEXCOM RMA Service Form" for the RMA number apply process.
- Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NEXCOM is not responsible for the devices/parts.
- Customers are responsible for the safe packaging of defective products, making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as "Out of Warranty."
- Any products returned by NEXCOM to other locations besides the customers' site will bear an extra charge and will be billed to the customer.

Repair Service Charges for Out-of-Warranty Products

NEXCOM will charge for out-of-warranty products in two categories, one is basic diagnostic fee and another is component (product) fee.

System Level

- Component fee: NEXCOM will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.
- Items will be replaced with NEXCOM products if the original one cannot be repaired. Ex: motherboard, power supply, etc.
- Replace with 3rd party products if needed.
- If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Board Level

- Component fee: NEXCOM will only charge for main components, such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistors, capacitors.

If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Safety Information

Before installing and using the device, note the following precautions:

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.

The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needlenose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Safety Precautions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
7. Do not leave this equipment in either an unconditioned environment or in a above 40°C storage temperature as this may damage the equipment.
8. The openings on the enclosure are for air convection to protect the equipment from overheating. DO NOT COVER THE OPENINGS.
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never pour any liquid into an opening. This may cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If one of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.
16. Do not place heavy objects on the equipment.
17. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.
18. **CAUTION**: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
19. The computer is provided with CD drives that comply with the appropriate safety standards including IEC 60825.

Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at www.nexcom.com.

2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:

   – Product name and serial number
   – Detailed information of the peripheral devices
   – Detailed information of the installed software (operating system, version, application software, etc.)
   – A complete description of the problem
   – The exact wordings of the error messages

Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.
2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.
3. CompactFlash: Turn off the unit's power before inserting or removing a CompactFlash storage card.

Conventions Used in this Manual

Warning: Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.

Caution: Information to avoid damaging components or losing data.

Note: Provides additional information to complete a task easily.

Battery - Safety Measures

Caution

- Risk of explosion if battery is replaced by an incorrect type.
- Dispose of used batteries according to the instructions.

Safety Warning

This equipment is intended for installation in a Restricted Access Location only.

Resetting the Date and Time

Note: Remember to reset the date and time upon receiving the product. You can set them in the AMI BIOS. Refer to chapter 4 for more information.

Global Service Contact Information

Headquarters

NEXCOM International Co., Ltd.
15F, No. 920, Chung-Cheng Rd.,
Zhonghe District, New Taipei City, 23586,
Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7782
www.nexcom.com

America

USA

NEXCOM USA
2883 Bayview Drive,
Fremont CA 94538, USA
Tel: +1-510-656-2248
Fax: +1-510-656-2158
Email: sales@nexcom.com
www.nexcom.com

Asia

Taiwan

Central Taiwan Office
16F, No.250, Sec. 2, Chongde Rd.,
Beitun Dist., Taichung City 406, R.O.C.
Tel: +886-4-2249-1179
Fax: +886-4-2249-1172
Email: sales@nexcom.com.tw
www.nexcom.com.tw

Japan

NEXCOM Japan
9F, Tamachi Hara Bldg.,
4-11-5, Shiba Minato-ku,
Tokyo, 108-0014, Japan
Tel: +81-3-5419-7830
Fax: +81-3-5419-7832
Email: sales@nexcom-jp.com
www.nexcom-jp.com

China

NEXCOM China
2F, Block 4, Venus Plaza, Bldg. 21,
ZhongGuanCun Software Park, No. 8,
Dongbeiwang West Rd., Haidian District,
Beijing, 100193, China
Tel: +86-10-8282-6599
Fax: +86-10-8282-5955
Email: sales@nexcom.cn
www.nexcom.cn

Shanghai Office

Room 603/604, Huiyinmingzun Plaza Bldg., 1,
No.609, Yunlin East Rd.,
Shanghai, 200062, China
Tel: +86-21-5278-5868
Fax: +86-21-3251-6358
Email: sales@nexcom.cn
www.nexcom.cn

Shenzhen Office
Room1707, North Block, Pines Bldg.,
No.7 Tairan Rd., Futian Area,
Shenzhen, 518040, China
Tel: +86-755-8332-7203
Fax: +86-755-8332-7213
Email: sales@nexcom.cn
www.nexcom.cn

Wuhan Office
1-C1804/1805, Mingze Liwan,
No. 519 South Luoshi Rd.,
Hongshan District,
Wuhan, 430070, China
Tel: +86-27-8722-7400
Fax: +86-27-8722-7400
Email: sales@nexcom.cn
www.nexcom.cn

Chengdu Office
9F, Shuxiangxie, Xuefu Garden,
No.12 Section 1, South Yihuan Rd.,
Chengdu, 610061, China
Tel: +86-28-8523-0186
Fax: +86-28-8523-0186
Email: sales@nexcom.cn
www.nexcom.cn

Europe
Italy
NEXCOM ITALIA S.r.l
Via Gaudenzio Ferrari 29,
21047 Saronno (VA), Italia
Tel: +39 02 9628 0333
Fax: +39 02 9286 9215
Email: nexcomitalia@nexcom.eu
www.nexcomitalia.it

United Kingdom
NEXCOM EUROPE
10 Vincent Avenue,
Crownhill Business Centre,
Milton Keynes, Buckinghamshire,
MK8 0AB, United Kingdom
Tel: +44-1908-267121
Fax: +44-1908-262042
Email: sales.uk@nexcom.eu
www.nexcom.eu

Package Contents

Before continuing, verify that the VTC 100 package that you received is complete. Your VTC 100 package should have all the items listed in the following table.

Item	P/N	Name	Specification	Qty
1	4NCPM00302X00	Power connector	TERMINAL BLOCKS 3P PHOENIX CONTACT:1777992	1
2	602DCD0644X00	CD DRIVER		1

Ordering Information

The following provides ordering information for VTC 100.

- **VTC 100-A0E (P/N: TBD)**
  - ARM® Cortex™-A8 720MHz Processor with 256MB DDR2 and WEC7 system
- **VTC 100-A1E (P/N: 10V00010000X0)**
  - ARM® Cortex™-A8 720MHz Processor with 256MB DDR2, GPS and WEC7 system
- **VTC 100-A1U (P/N: 10V00010001X0)**
  - ARM® Cortex™-A8 720MHz Processor with 256MB DDR2, GPS and Linux Ubuntu
- **VTC 100-A5E (P/N: TBD)**
  - ARM® Cortex™-A8 720MHz Processor with 256MB DDR2, GPS, CAN bus and WEC7 system

Chapter 1: Product Introduction

Overview

VTC 100 Front View

VTC 100 Rear View

Key Features

- Compact and fanless design
- ARM Cortex™-A8 Processor with 720MHz frequency
- Variety wireless communication options
- Built-in CAN Bus V2.0b; optional support for J1939/J1708
- Wide range DC input from 9~ 36V
- Smart power management and low voltage protection
- Operating System Support WEC 7 and Linux 3.1 driver

Hardware Specifications

MPU

- ARM Cortex™-A8 Processor with 720MHz frequency

Memory

- On-board DDR2 256MB

Expansion

- 1x CAN Bus module with J1939/J1708 for option
- 1x Mini-PCIe socket (USB) x 1 for WWAN option
- 1x Bundle GPS module

I/O Interface-Front

- 2x USB 2.0 host type A connector
- 1x Line-out, 1 x Mic-in
- 1x System reset button
- 2x LED's for power, storage
- 1x Power button
- 1x SIM card socket
- 4x Antenna hole reserved for SMA-type antenna connector (WWAN/ WLAN)

I/O Interface-Rear

- 1x 9~36VDC input with Ignition and 6W typical power consumption
- 1x DB9 RS-232 (COM1)
- 1x DB9 RS-485 (COM2)
- 1x DB9 female connector for 3GPI and 3GPO
- 1x DB15 VGA
- 1x RJ45 with LEDs for 10/ 100/ 1000Mbps Ethernet
- 1x SMA-type GPS antenna connector
- 1x Antenna hole reserved for SMA-type antenna connector (WWAN/ WLAN)

Expandable Storage

- Micro SDHC Slot (Bundle with 4GB)

Power Management

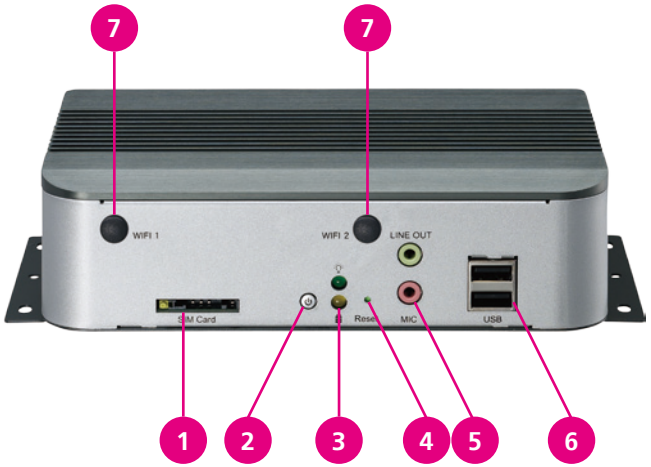
- Selectable boot-up & shut-down voltage for low power protection
- HW design ready for 8-level delay time on/off at user's self configuration
- Power on/off ignition, software detectable

Operating System

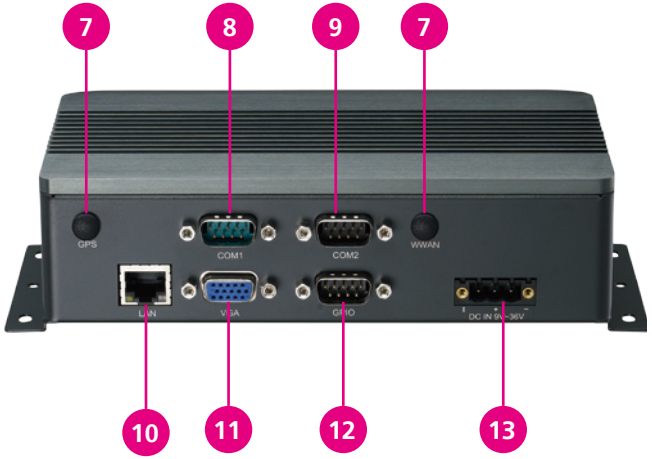
- Windows Embedded Compact 7
- Linux 3.2

Getting to Know VTC 100

Front Panel

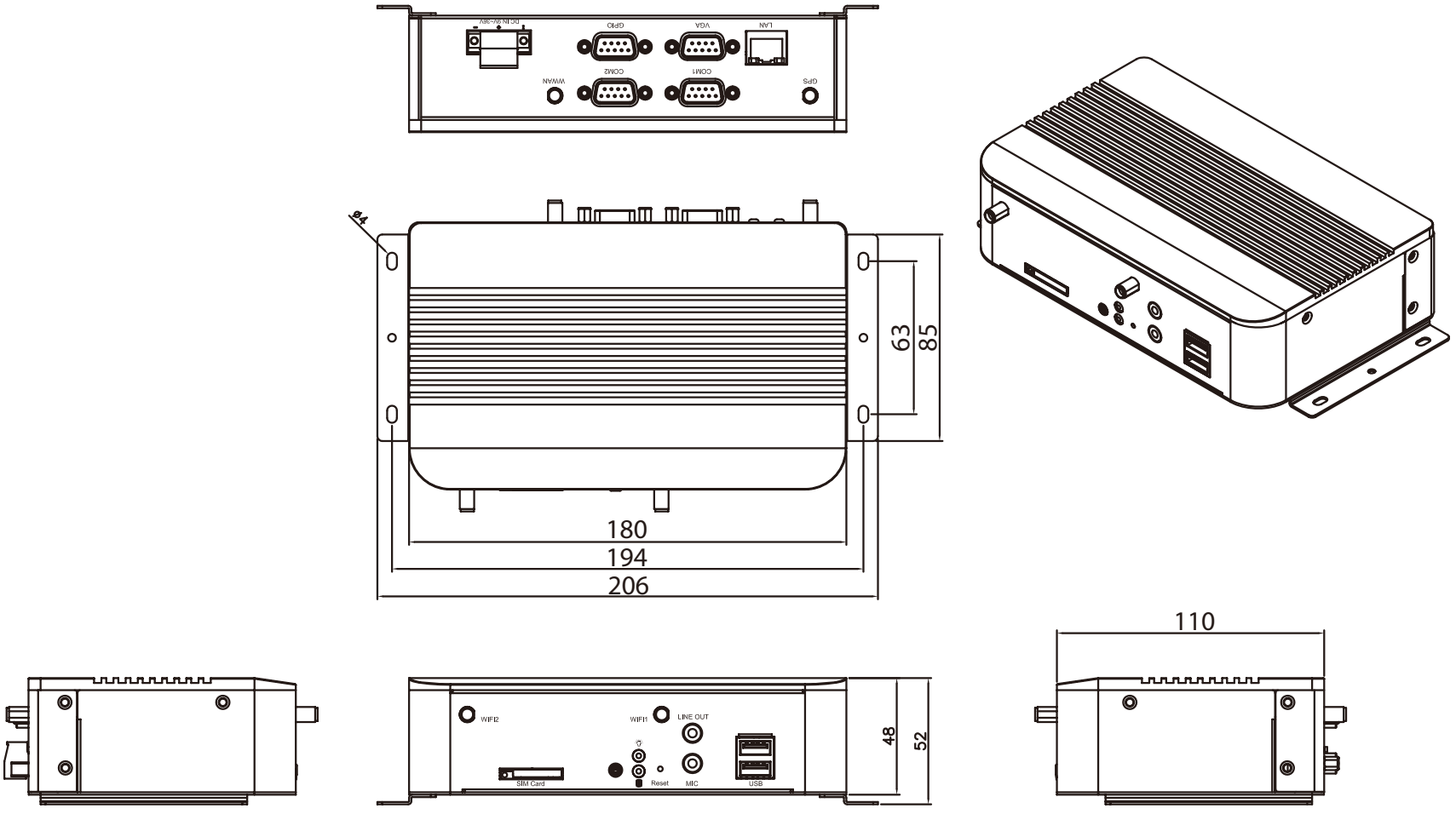


Rear Panel



Item	Function	Description
1	SIM Card Slot	VTC can be internally integrated with a 3.5G Mini Card module. The SIM card bracket is on the carrier board. When using the GPRS/UMTS/ HSDPA function, insert the SIM card into the SIM card socket. Make sure to turn off VTC before inserting the SIM card.
2	Power Button	When the ignition is from "low" to "high", VTC will turn on automatically. When the ignition is "high", press the power button 5~6 secs to turn off VTC. When the ignition is "high", VTC has been turned off, press the power button 1~2 secs to turn on the system. When the ignition is from "high" to "low", VTC will turn off automatically. When the ignition is "low", pressing the power button will not turn on VTC.
3	LED indicator	Green is for power on/off status. Orange is for storage status.
4	Reset Button	Press this button to restart VTC.
5	Audio	Line-out. Line-out is a stereo output for connecting external speakers. Mic-in. Mic-in receives monophonic input from an external microphone.
6	USB Port	The two USB ports are compliant with USB2.0 specifications.
7	Antenna Holes	The external antenna mounting holes are used to mount and connect the antenna to a WLAN module, WWAN module and GPS.
8	COM1	RS-232 connector
9	COM2	RS-485 connector
10	LAN Port	The LAN port is an RJ45 interface with integrated LEDs and supports 10/100/1000Mbps Ethernet data transfer rates.
11	VGA Port	The DB15 VGA port supports resolutions of 640 x 480 and 800 x 600
12	GPIO	DB9 female connector for 3 GPIO Input (source type; 0~30V), Output (sink type;20mA max) and CAN bus support.
13	Power Input Connector	9 ~ 36VDC power Input.

Mechanical Dimensions



Chapter 2: Jumpers and Connectors

This chapter describes how to set the jumpers on the motherboard. Note that the following procedures are generic for all VTC 100 series.

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers Screwdrivers
  - A grounding strap
  - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on the computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

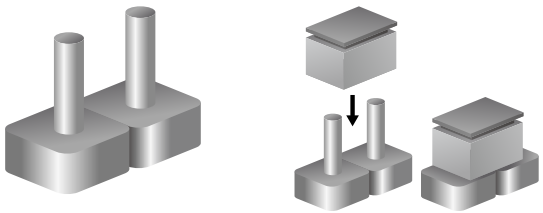
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

Jumper

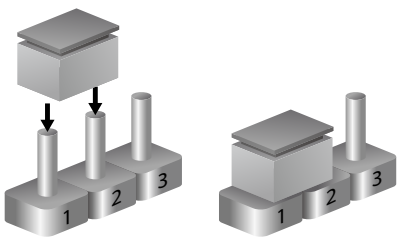
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is **short**. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is **open**.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)

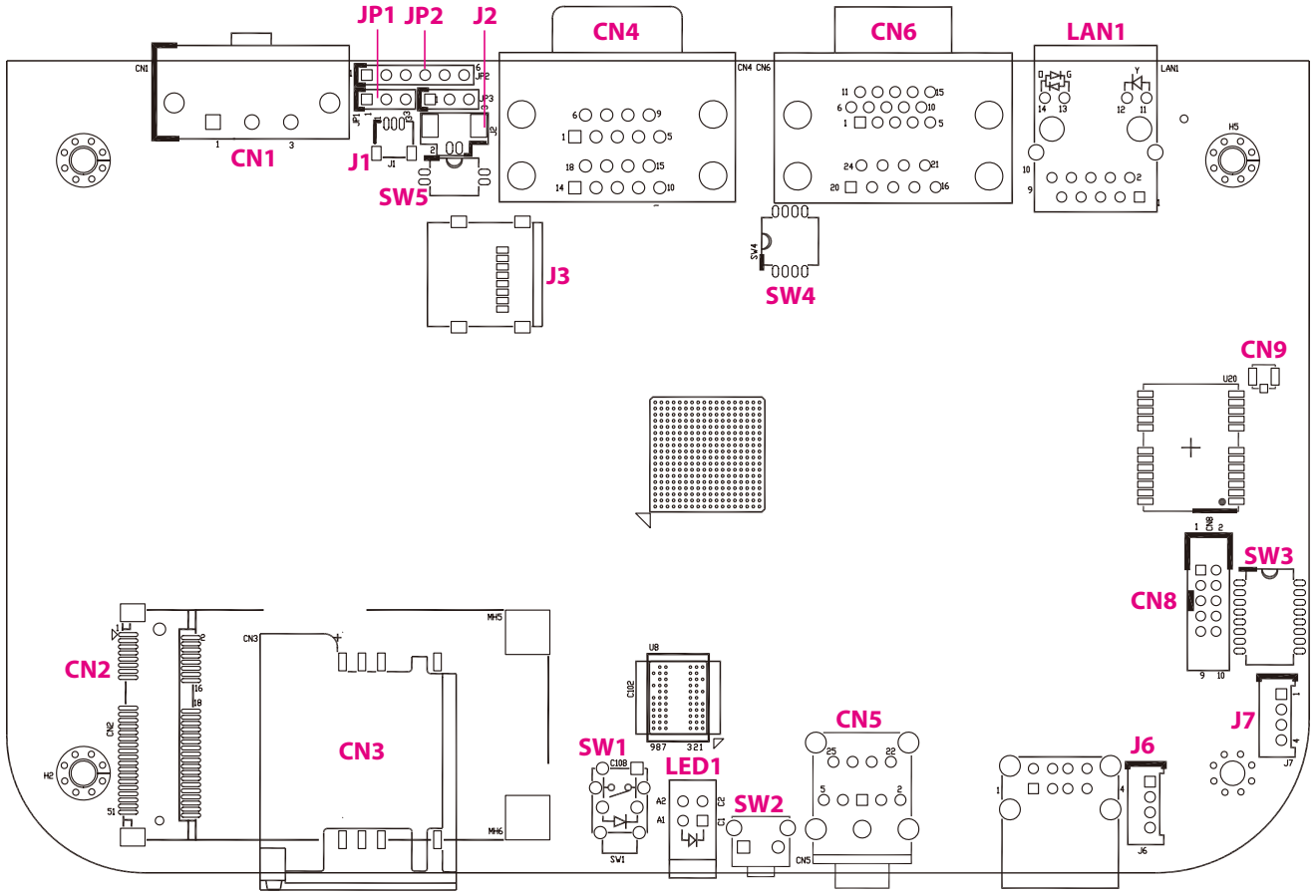


Three-Pin Jumpers: Pins 1 and 2 Are Short



Locations of the Jumpers and Connectors

The figure below is the main board which is the board used in the VTC 100 system. It shows the locations of the jumpers and connectors.



Jumper and DIP Switch Settings

MCU Bootloader Power Select

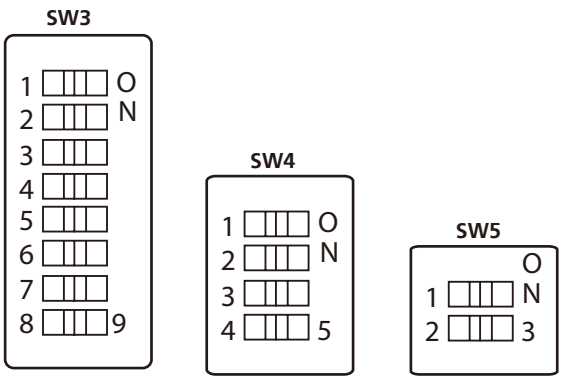
Connector type: 1x3 3-pin header, 2.54mm pitch

Connector location: JP1

Pin	Status	Function Description
1-2	Short	+3.3V

DIP Switch

Connector location: SW3, SW4, SW5



SW3 Connector pin definition

SW3				
Delay ON/OFF	Full Off			Full Open
Pin1(Delay OFF)	OFF	ON	OFF	ON
Pin2(Delay ON)	OFF	OFF	ON	ON

Time Setting (Delay ON)	10Sec	30Sec	1Min	5Min	10Min	15Min	30Min	1Hour
Pin3	OFF	OFF	OFF	OFF	ON	ON	ON	ON
Pin4	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Pin5	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Time Setting (Delay OFF)	20Sec	1Min	5Min	10Min	30Min	1Hour	6Hour	18Hour
Pin6	OFF	OFF	OFF	OFF	ON	ON	ON	ON
Pin7	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Pin8	OFF	ON	OFF	ON	OFF	ON	OFF	ON

SW4 Connector pin definition

Startup/Shutdown	11.5V/10.5V	12V/11V	12.5V/11V	12.5V/11.5V
Pin1	OFF	ON	OFF	ON
Pin2	OFF	OFF	ON	ON

Startup/Shutdown	23V/21V	24V/22V	25V/22V	25V/23V
Pin1	OFF	ON	OFF	ON
Pin2	OFF	OFF	ON	ON

Setting Voltage 12V/24V	12V	24V	9~36V	9~36V
Pin3	ON	ON	OFF	OFF
Pin4	ON	OFF	ON	OFF

SW5 Connector pin definition

SW5		
ON/OFF	MCU BOOT	MCU NOMO
Pin1 (MCU BOOT)	ON	OFF
ON/OFF	800X600	640X480
Pin2 (VGA RES SET)	OFF	ON

Connectors

MCU Bootloader Pin Definition

Connector type: 1x6 6-pin header, 2.54mm pitch

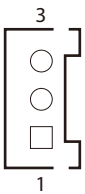
Connector location: JP2

Pin	Defintion
1	+3.3V
2	SWDIO
3	SWDCLK
4	SWO
5	nRESET
6	GND

Debug Ports

Connector type: 1x3 3-pin header, 1.0mm pitch

Connector location: J1 (MCU) and J5 (SOC)



Pin	Pin Name (J1)	Pin Name (J5)
1	GND	GND
2	MCU RXD	MPU RXD_0
3	MCU TXD	MPU TXD_0

VBAT CONN

Connector type: 1x2 2-pin header, 1.25mm pitch

Connector location: J2

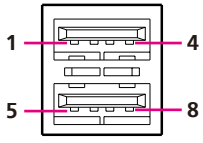
Connector pin definition

PIn	Definition
1	GND
2	+3V
MH1	GND
MH2	GND

USB Ports

Connector type: Dual USB ports
1x4 4-pin header, 1.25mm pitch

Connector location: CN7 (External), J6 and J7 (Internal)



CN7

J6 & J7

CN7 Connector pin definition

Pin	Definition	Pin	Definition
1	Power(+5V)	2	D-
3	D+	4	GND
5	POWER(+5V)	6	D-
7	D+	8	GND
MH1	GND	MH2	GND
MH3	GND	MH4	GND

J6 & J7 Connector pin definition

Pin	Name (J6 USB Client)	Name (J7 USB HOST)
1	VBUS	POWER(+5V)
2	D-	D-
3	D+	D+
4	GND	GND

WIFI & BT Connector

Connector type: 1x16 16-pin header, 1.0mm pitch

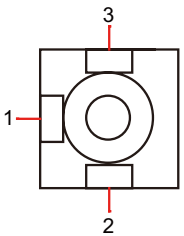
Connector location: J4

Connector pin definition

Pin	Definition	Pin	Definition
1	N/A	2	N/A
3	GND	4	WLAN_EN
5	WLAN_RESET	6	GND
7	WIFI CLK	8	WIFI CMD
9	WIFI DAT3	10	WIFI DAT2
11	WIFI DAT1	12	WIFI DAT0
13	GND	14	GND
15	POWER(+3.3V)	16	POWER(+3.3V)

GPS Connector

Connector location: CN9

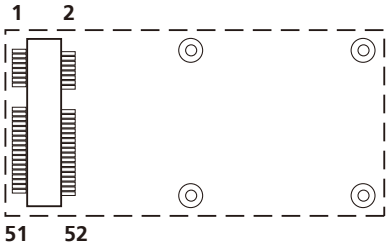


Connector pin definition

Pin	Definition
1	RF IN
2	GND
3	GND

Mini PCI-E Connector

Connector location: CN2

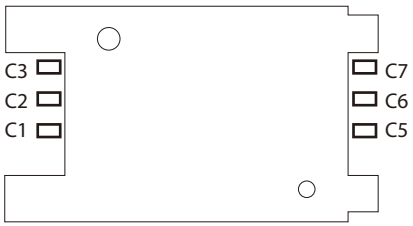


Important Pin Assignments

Pin	In/Output	Function	Voltage Levels
1,3	IN	Microphone	
5,7	OUT	Speaker Out	
11	OUT	GSM Module VREF OUT	1.8V or 2.6V
17	OUT	PCM Data Out	
19	OUT	PCM Sync Out	
32	OUT	SMS RI Out, for wake up system	
33	IN	RESET#	
45	OUT	PCM CLK Out	
47	IN	PCM Data In	
49	OUT	UART Receive Data (GSM Module need to connect to TX)	
51	IN	UART Transmit Data (GSM Module need to connect to RX)	
36,38	IN/OUT	USB	
20	IN	Module Disable (Low)	
42	OUT	WWAN LED	
8,10,12,14	IN/OUT	SIM Card	

SIM Card Connector

Connector location: CN3

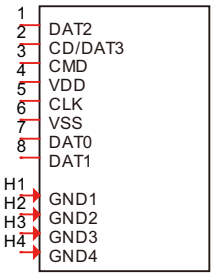


Connector pin definition

Pin	Definition	Pin	Definition
C1	UIM POWER	C5	GND
C2	UIM RST	C6	NC
C3	UIM CLK	C7	UIM DAT
SW1	GND	SW2	GND

Micro SD Connector

Connector location: J3

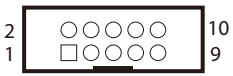


Connector pin definition

Pin	Definition	Pin	Definition
1	DAT2	2	DAT3
3	CMD	4	VDD
5	CLK	6	GND
7	DAT0	8	DAT1
MH1	GND	MH2	GND
MH3	GND	MH4	GND

CAN Module Connector

Connector location: CN8

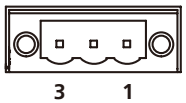


Connector pin definition

Pin	Definition	Pin	Definition
1	UR TXD	2	UR RXD
3	CAN DI1	4	CAN DO1
5	GND	6	GND
7	NC	8	NC
9	POWER(+5V)	10	NC

POWER INPUT (CN1)

Connector location: CN1



Connector pin definition

Pin	Definition
1	GND
2	VIN(9V~36V)
3	IGNITION

Power Button

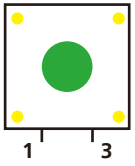
Connector location: SW1

Connector pin definition

Pin	Definition	Pin	Definition
1	GND	2	NC
3	3V3ALW	4	NC
A1	5VSB	C1	5VSB

Reset Button

Connector location: SW2

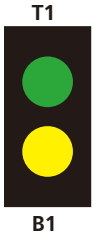


Connector pin definition

Pin	Definition
1	RST_BTN#
2	GND

Power On & SD Active LED

Connector location: LED1

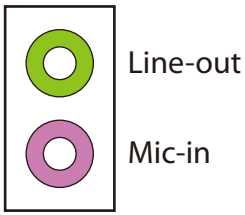


Connector pin definition

LED No.	Definition
T1	POWER LED
B1	HD LED

Line-out and Mic-in Connectors

Connector location: CN5B and CN5A



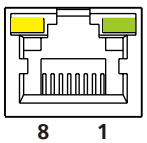
Connector pin definition

Pin	Definition	Pin	Definition
1	GND	2	NC
3	GND	4	MIC DET
5	MIC JACK	6	NC
22	LINE_OUT_L	23	GND
24	GND	25	LINE_OUT_R

Power On & SD Active LED

Connector type: RJ-45

Connector location: LAN1



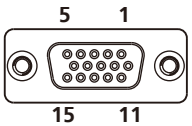
Connector pin definition

Pin	Definition	Pin	Definition
1	TX+	2	TX-
3	RX+	4	N/C1
5	N/C2	6	RX-
7	N/C3	8	N/C4

VGA connector

Connector type: DB-15 port, 15-pin D-Sub

Connector location: CN6B



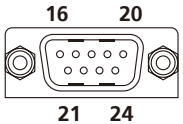
Connector pin definition

Pin	Definition	Pin	Definition
1	RED	2	GREEN
3	BLUE	4	Gnd
5	Gnd	6	Gnd
7	Gnd	8	Gnd
9	VCC	10	Gnd
11	Gnd	12	NC
13	Hsync	14	Vsync
15	NC	16	OPEN

Standard RS232 Interface

Connector type: DB-9 port

Connector location: CN6A



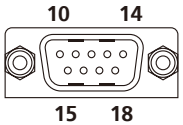
Connector pin definition

Pin	Definition	Pin	Definition
16	DCD	17	RXD
18	TXD	19	DTR
20	Gnd	21	DSR
22	RTS	23	CTS
24	RI		

RS485 connector

Connector type: DB-9 port

Connector location: CN4B



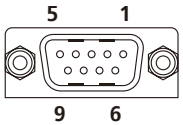
Connector pin definition

Pin	Definition	Pin	Definition
10	NC	11	NC
12	NC	13	NC
14	GND	15	RS485_-
16	RS485_+	17	NC
18	NC		

GPIO connector

Connector type: DB-9 port

Connector location: CN4A



Connector pin definition

Pin	Definition	Pin	Definition
1	INPUT_1 PORT	2	INPUT_2 PORT
3	INPUT_3 PORT	4	OUTPUT_1 PORT
5	GND	6	OUTPUT_2 PORT
7	CANH	8	CANL
9	OUTPUT_3 PORT		

Chapter 3: System Setup

Removing the Chassis Cover

CAUTION! Prior to removing the chassis cover, make sure the unit's power is off and disconnected from the power sources to prevent electric shock or system damage.

1. The screws on the chassis are used to secure the cover to the chassis. Remove these screws and put them in a safe place for later use

2. Lift the cover upward then remove it from the chassis.

Installing a WWAN Module

1. The Mini PCI Express slot shown below is used to install a WWAN communication module such as GPRS, UMTS or HSDPA.

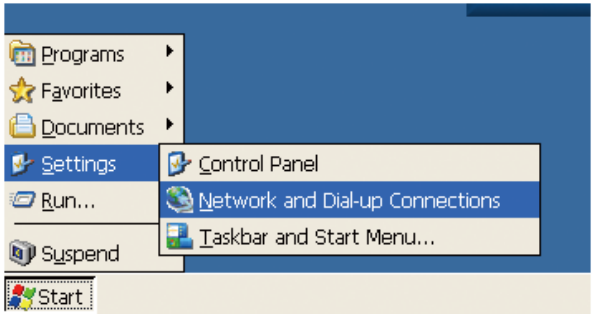
Mini PCI-E slot for WWAN module installation

2. Insert the module into the Mini PCI Express slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot.
3. Push the module down then secure it with mounting screws.
4. Attach one end of the RF cable onto the module.
5. Mount the other end of the cable to the antenna mounting hole located at the front panel of the chassis.

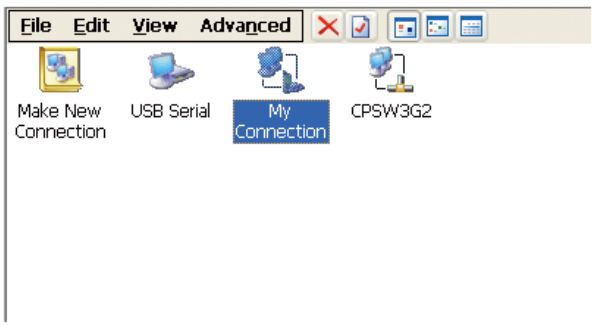
WWAN Dial-up Setting

Configure using default settings

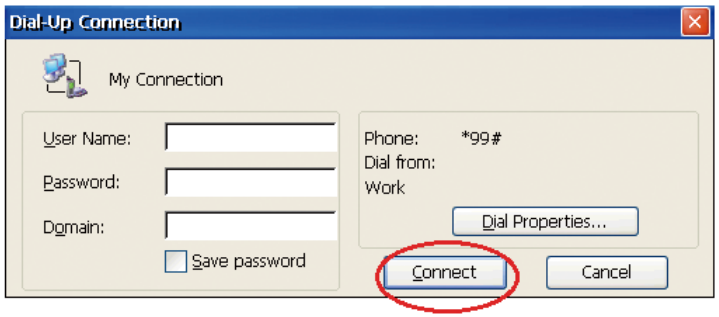
1. Start → Settings → Network and Dial-up Connections



2. Double click on "My Connection".

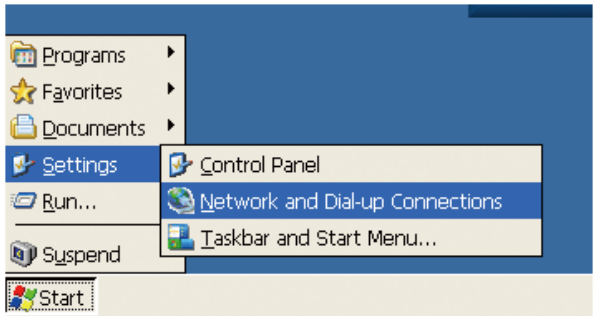


3. Click the "Connect" button.

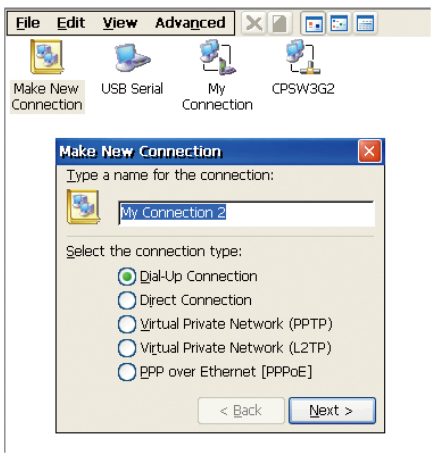


Configure using manual settings

1. Start → Settings → Network and Dial-up Connections



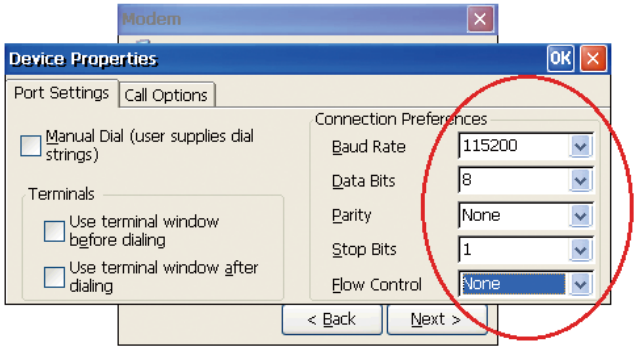
2. Make New Connection → (type name) →Dial-Up Connection → Next



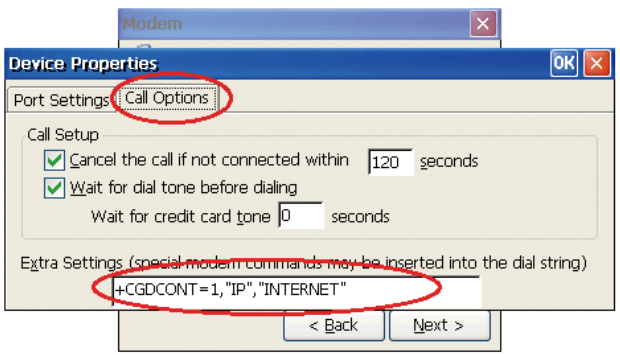
3. Select the WWAN module under the "Select a modem" drop down list, the example shown below is "Cinterion USB Modem".

4. Click"Configure"

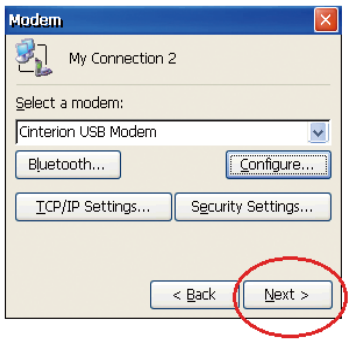
5. Set "Connection Preferences"as follows.



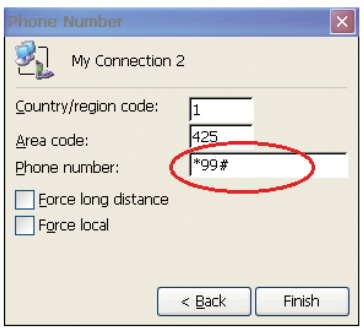
6. Select "Call Options" and enter { +CGDCONT=1,"IP","INTERNET" } (It depends on your Telecom's setting).



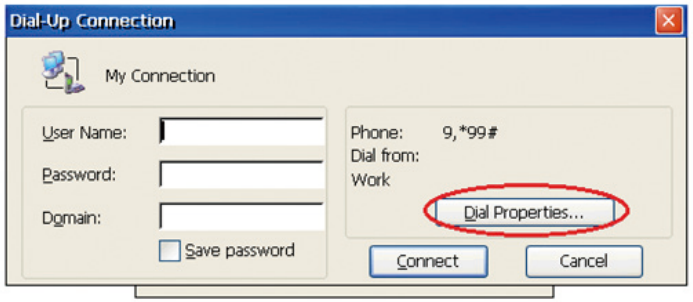
7. Click"Next".



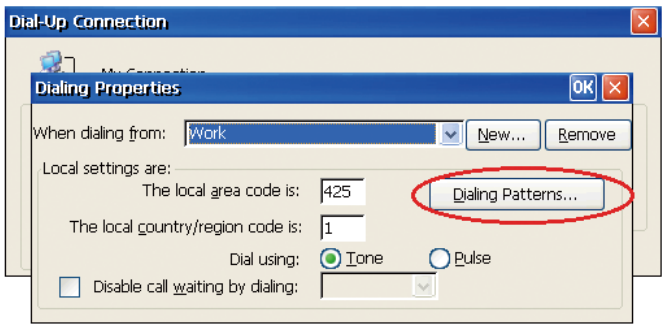
8. Enter "*99#" in "Phone number" (It depends on your Telecom's setting).



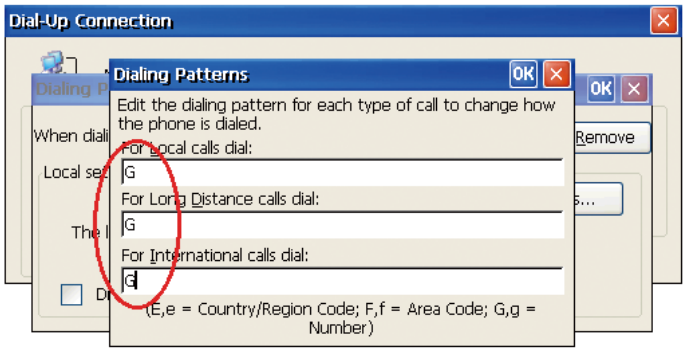
9. Click"Dial Properties".



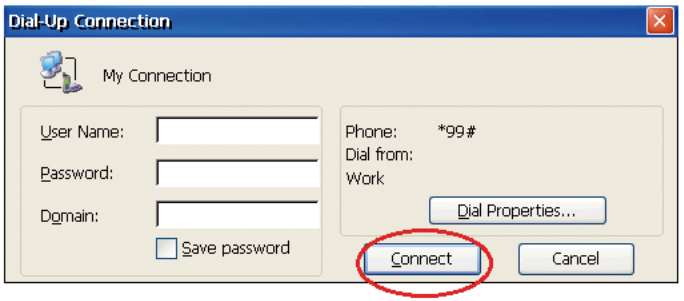
10. Click"Dialing Patterns".



11. Enter "G" (It depends on your Telecom's setting).



12. Click"Connect"



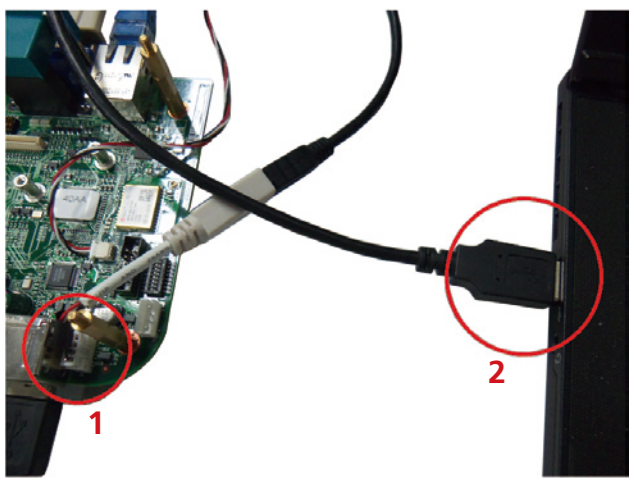
Activesync Setting

Hardware Setup

An optional cable is provided to connect the PC and VTC for activesync function.

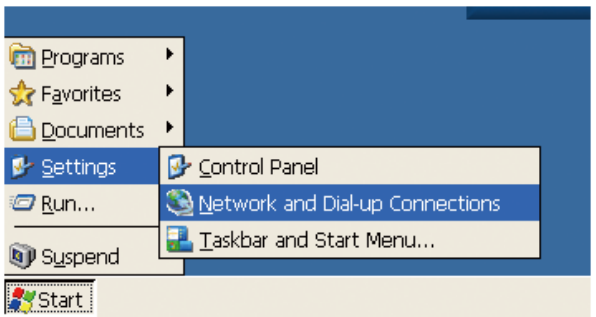
To setup activesync, please follow the following steps:

1. Remove the chassis cover.
2. Plug in this cable to the connector (marked "1").
3. Connect cable to the USB port on the computer (marked "2").

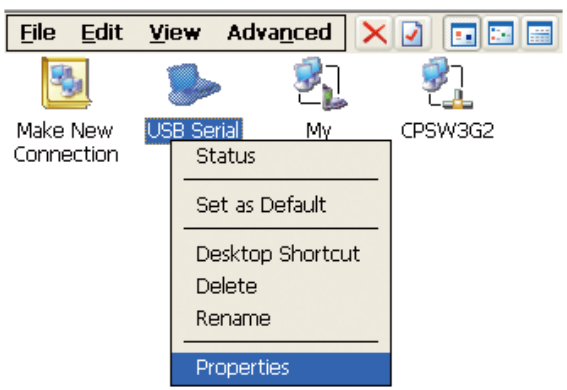


VTC Software Setting

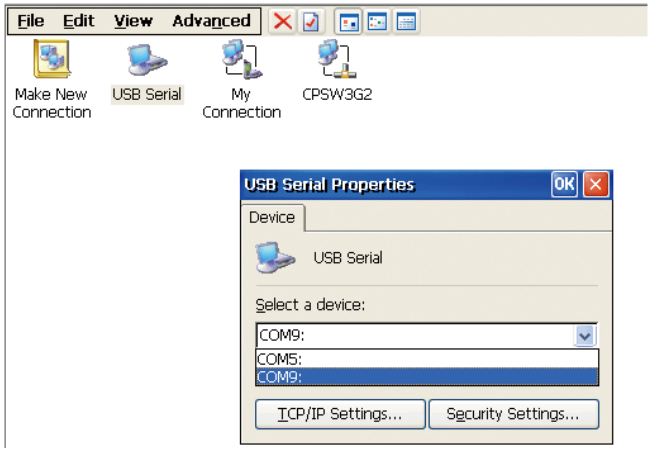
1. Start → Settings → Network and Dial-up Connections



2. Highlight and right click "USB Serial" → Properties



3. Select "COM9" under the "Select a device" drop down list. After setting is completed, the development software will connect with VTC.



Appendix A: CAN Module Setup and Command

VTC 100 series offer an option to integrate the CAN BUS module, VIOX-CAN01, into VTC 100 system. The form factor of this VIOX-CAN01 is proprietary and it can support either SAE J1939 or SAE J1708 via connection in the first time. The maximum VIOX-CAN01 installed in VTC 100 series is up to three units. Please note they are factory option.

VIOX-CAN01 Setup

When you start connecting VTC 100 device to CAN bus device, you need a terminal program to send and receive data. To use the terminal program, please follow the setting below.
(1) Set the proper corresponding "COM" port and its data rate is 9600
(2) Set data bits at 9, stop bit at 1 and no parity bits.

After the setting, you will see the prompt with ">" character. This indicates that the device is in the idle state and ready to receive characters on the COM port.

If you do not see prompt string, please reset the device with ATR (reset) command and then press the return key:
>ATR or >AT R (spaces are optional; and case is in-sensetive).
You can also type HEX code instead:
"41", "54", "5A", "0D"

If you see the strange characters instead of ">", you may set the incorrect baud rate. Please check baud rate. If you send the incorrect command, the device will show a single question mark ("?") to indicate your input is not understood. If VTC 100 fails to link to the BUS, it will show "PLEASE REBOOT".

Once VTC 100 connect to BUS, it will start to try which protocol is connected either J1939 or J1708. Once it is determined, it will only accept the successful protocol next time unless using ATR command to reset it. This means you can change the protocol by reset command. After the reset command, please power off the device and turn on it again.

In case, the device cannot find correct protocol after 180 seconds, it will enter sleeping mode for power saving.

There are several output format available for the different application including:
(1) Simple Data by ASCII Code
(2) Raw Data
(3) Packaged Messages by ASCII or HEX code.

The default setting is Simple Data Format. The device will send messages out after it communicates with vehicle successfully. The output format can be changed via setting the AT command. Please refer the following section of AT command.

AT Command Summary

@1	AT@1: Display version information
BRxy	Setting RS232 baud rate. xy is baud rate parameter. ATBR09: 9600 ATBR19: 19200 ATBR38: 38400 ATBR57: 57600 ATBR99: 115200
Eh	ATE0: echo off(Default) ATE1; echo on
T	ATT: Terminate sending. To use ATS will continue it.
I	ATI : Request vehicle ID, the length is variable. 1.) J1708: Output format: ASCII code Byte 0:0x2A Byte 1: Vehicle ID byte 1 Byte 2: Vehicle ID byte 2 Byte N:Vehicle ID byte N Byte N+1: Check Sum=Byte 1+Byte2+…….+Byte N Byte N+2:0x0D Byte N+3:0x0A N: Max 20 2.)J1939 Byte 0:0x2A Byte 1: Vehicle ID byte 1 Byte 2: Vehicle ID byte 2 Byte N:Vehicle ID byte N Byte N+1: Check Sun= Byte1+Byte2 +…..ByteN Byte N+1:0x0D Byte N+2:0x0A N: Max 35

PA	ATPA: Print data by ASCII CODE format
PH	ATR: Clear protocol and distance (D1 ,D2)memory, the ATR command clear current protocol then continue learning next new protocol.
RJ	ATRJ: Request J1939 FMS High Resolution Total Vehicle Distance #33~#36
RH	ATRH: Request Hino Truck Total vehicle distance (#33~#36)
S	ATS: Continue auto-send data every 100~200ms. To use ATT will terminal it.
SS	ATSS: Auto- send Simple Data every 100~200 ms. Refer to Simple Data format Protocol
SP	ATSP: Auto-send Packaging Messages every 100~200 ms. Refer to Packaging Messages protocol.
SR	ATSR: Auto-send J1939/J1708 Raw Data, Refer to Raw Data Protocol.
X	ATX: Request to send data of alternate, data format as ATS/ATSP command. For J1939 protocol: Packing1→Packing2→Packing 3→Packing4→Packing5→ Packing6→Packing1 For J1708 protocol: Packing1→Packing2→Packing 3→Packing4→Packing5→ Packing1
#xy	AT#xy: The command will print designated data by ASCII code. “xy” is data address, it is decimal. J1708: 00~53 J1939: 00~99. EX: AT#01 , to get speed high byte.

Simple Data Protocol: (ASCII CODE)

Data	Description
HEAD	@
Byte 0	,
Byte 1	Speed , (0~255) KM/HR
Byte 2	,
Byte 3	RPM High Byte (RPMHB)
Byte 4	,
Byte 5	RPM Low Byte(RPMLB) , RPM=RPMHB*256+RPMLB
Byte 6	,
Byte 7	Engine Loading, (0~100%)
Byte 8	,
Byte 9	Battery Voltage (BV), = (BV+100)/10 (v)
Byte 10	,
Byte 11	Engine Temperature(ET), =ET-40°C
Byte 12	,
Byte 13	Throttle position 0~100 %
Byte 14	,
Byte 15	Status , Note 2
Byte 16	,
Byte 17	MAF (0~255), MAF RATE= MAF * 3;
Byte 18	,
Byte 19	Distance : D1
Byte 20	,
Byte 21	Distance: D2
Byte 22	,
Byte 23	FU, Average Fuel Economy (km/L) =Fu /10
Byte 24	,
Byte 25	Check sum (odd numbers)= Byte1+ Byte3+Byte5+ Byte7+Byte9+Byte11+ Byte13+ Byte15+Byte17+ Byte19+Byte21+Byte23
Byte 26	Carry return (0x0D)
Byte 27	Line feed (0x0A)

Simple Data Protocol: (HEX CODE)

Data	Description
HEAD	@ (=0x40)
Byte 1	Speed , (0~255) KM/HR
Byte 2	RPM High Byte (RPMHB)
Byte 3	RPM Low Byte(RPMLB) , RPM=RPMHB*256+RPMLB
Byte 4	Engine Loading, (0~100%)
Byte 5	Battery Voltage (BV), = (BV+100)/10 (v)
Byte 6	Engine Temperature(ET), =ET-40°C
Byte 7	Engine Loading, (0~100%)
Byte 8	Status , Note 2
Byte 9	MAF (0~255), MAF RATE= MAF * 3;
Byte 10	Distance: D1
Byte 11	Distance: D2
Byte 12	FU, Average Fuel Economy (km/L) =Fu /10
Byte 13	TCheck sum (odd numbers)= Byte1+ Byte2+Byte3+ Byte4+ Byte5+Byte6+ Byte7+ Byte8+Byte9+ Byte10+ Byte11+Byte12
Byte 14	Carry return (0x0D)
Byte 15	Line feed (0x0A)

NOTE:
1.) Data format : ASCII CODE
@ , 7 8 , 0 E , 7 0 , 0 0 ,0 3 , 9 8 , 2 8 , Status ,MAF,D1,D2,Fu,CS
speed=78 km/hr
rpm=0x0E70= 3696
2.) status:
Bit 7:
0: Normal
1: Emergency Braking (Acceleration < - 6 m/s2)
Bit 6:
0: Brake OFF
1: Brake ON
Bit 5:
0: Clutch OFF
1: clutch ON
Bit 4:
0: Cruise Control OFF
1: Cruise Control ON
Bit 3:
0: Brake (ON/OFF) unavailable
1: Brake(ON/OFF) available
Bit 2:
0:Clutch (ON/OFF) unavailable
1: Clutch (ON/OFF) available
Bit 1:
0: Cruise Control (ON/OFF) unavailable
1: Cruise Control (ON/OFF) available
Bit 0:
0: NORMAL
1: DTC ON
2.) Distance = D1*256+D2
3.) Average Fuel Economy =Fu /10

J1939 Raw Data Protocol (HEX CODE)

Support for J1939 PGN / SPN access as defined in the J1939 standards. This function will report all PGNs and their source node on the J1939 network.

Each SPN under this function should be set to a size of 32 bits.

J1939	Format	
Byte 0	@ (=0x40)	
Byte 1	Bit4,3,2: Priority Bit0: Data Page Bit1,5,6,7:Reversed	
Byte 2	PDU Format (PF)	PGN
Byte 3	PDU Specific (PS)	
Byte 4	Source Address	
Byte 5	Data1	
Byte 6	Data2	
Byte 7	Data3	
Byte 8	Data4	
Byte 9	Data5	
Byte 10	Data6	
Byte 11	Data7	
Byte 12	Data8	
Byte 13	Check Sum	
Byte 14	0x0D	
Byte 15	0x0A	

J1708 Raw Data Protocol (HEX CODE)

This function will report all MID and PID that broadcasting on the J1708 network. Its data length is not fixed, please refer to SAEJ1708.

J1939	Format	PIDs 128-191	PIDs 0-127
Byte 0	@ (= 0x40)	@ (= 0x40)	@ (= 0x40)
Byte 1	Message identification (MID)	MID	MID
Byte 2	Parameter identification (PID)	PID	PID
Byte 3	Number of data bytes	Data1	Data1
Byte 4	Data 1	Data2	Check Sum
Byte 5	Data 2	Check Sum	0x0D
Byte 6	……..	0x0D	0x0A
Byte 7	Data N	0x0A	
Byte 8	Check Sum		
Byte 9	0x0D		
Byte 10	0x0A		

PIDs 0-127 describe data parameters that are one byte long.
PIDs 128-191 describe data parameters that consist of two bytes.
PIDs 192-253 The first byte following these PIDs will contain the number of data parameter bytes.

EX:
MID=128

0x40	0x80	0x15	0x01	0x32	0xC8	0x0D	0x0A
64	128	21	1	50	200	130	10

PID=21 (Engine ECU temperature)
Data=50

J1939 Packaged Messages Protocol

S

ATS: send packaged messages by turns.

Response HEX CODE (default) after ATPH command		
Packing 1: Byte 0:" @" ,(0x40) Byte 1: "1", (0x31) Byte 2: #00 Byte 3: #01 ..... Byte 19:#17 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 2: Byte 0: " @" ,(0x40) Byte 1: "2",(0x32) Byte 2: #18 Byte 3: #19 ..... Byte 19:#35 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 3: Byte 0: " @" ,(0x40) Byte 1: "3",(0x33) Byte 2: #36 Byte 3: #37 ..... Byte 19:#53 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A
Packing 4: Byte 0:" @" ,(0x40) Byte 1: "a",(0x41) Byte 2: #54 Byte 3: #55 ..... Byte 19:#71 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 5: Byte 0: " @" ,(0x40) Byte 1: "b",(0x42) Byte 2: #72 Byte 3: #73 ..... Byte 19:#89 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 6: Byte 0: " @" ,(0x40) Byte 1: "c",(0x43) Byte 2: #90 Byte 3: #91 ..... Byte 14:#102 Byte 19:0 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A

NOTE :
1. AT#00 ~ AT#102 respond ASCII CODE format data.
2. Packing 6, Byte15~Byte19 not defined (set to "0")
3. After ATPA command, byte 21& 22 were ignored.
4. This is the common J1939 measurement overview showing which measurements are available. Note that not all measurements are supported by the individual engines.

#00	Speed Low Byte (SLB)
#01	Speed High Byte (SHB) speed=(SHB*256+SLB)/256
#02	B7 B6 B5 B4 B3 B2 B1 B0 Clutch switch / Brake switch / NOT USED / Cruise control active 00 = pedal released, 01 = pedal depressed / 00 = pedal released, 01 = pedal depressed / 00 = switched off, 01 = switched on
#03	B7 B6 B5 B4 B3 B2 B1 B0 B7: Emergency brake(-6m/s2) B6: speed up (6m/s2) B5: Double Emergency brake (over -12m/s2) 1: Enable, 0:Disable PTO state 00000 = off/disabled 00101 = Set 11111 = not available
#04	0.4 % / Bit gain, Accelerator Pedal Position(APP) , 0 to 100 % APP= Data* 0.4
#05	Engine Total Fuel used 0,5 L / Bit gain , ETF1
#06	Engine Total Fuel used 0,5 L / Bit gain , ETF2
#07	Engine Total Fuel used 0,5 L / Bit gain , ETF3
#08	Engine Total Fuel used 0,5 L / Bit gain , ETF4 Engine Total Fuel used =((ETF4*256*256*256)+(ETF3*256*256)+(ETF2*256)+ETF1)*0.5
#09	Fuel Level (FL) , 0 to 100 %, 0.4 %/bit Fuel Level=FL*0.4
#10	RPM Low byte, RL
#11	RPM High byte, RH RPM= (RH*256+ RL)* 0.125

<table>
<tr><td>#12</td><td>
<table>
<tr><td>B7</td><td>B6</td><td>B5</td><td>B4</td><td>B3</td><td>B2</td><td>B1</td><td>B0</td></tr>
<tr><td></td><td colspan="3">NOT USED</td><td colspan="4">Engine Starter Mode</td></tr>
</table>
B7: 1, Total Vehicle Distance is provided by vehicle ECU
0, Total Vehicle Distance is calculation value
B3~B0:
0000 start not requested
0001 starter active, gear not engaged
0010 starter active, gear engaged
0011 start finished; starter not active after having been actively engaged ?
(after 50ms mode goes to 0000)?
0100 starter inhibited due to engine already running
0101 starter inhibited due to engine not ready for start (preheating)
0110 starter inhibited due to driveline engaged
0111 starter inhibited due to active immobilizer
1000 starter inhibited due to starter over-temp
1001-1011 Reserved
1100 starter inhibited - reason unknown
1101 error
1111 not available
</td></tr>
<tr><td>#13</td><td>
Axle location The value 0xFF indicates not available.
<table>
<tr><td>B7</td><td>B6</td><td>B5</td><td>B4</td><td>B3</td><td>B2</td><td>B1</td><td>B0</td></tr>
<tr><td colspan="4">Axle location Bit-mapped position number counting front to back facing forward
F = not available
position number, counting front to back on the vehicle. B7,B6,B5,B4
Axle location Bit-mapped position number counting front to back facing forward.</td><td colspan="4">Tire location Bit-mapped counting left to right facing forward
F = not available
The low order 4 bits represent a position number, counting left to right when facing in the direction of normal vehicle travel</td></tr>
</table>
</td></tr>
</table>

#14	Axle weight 0.5 kg / Bit gain (Low Byte),AWL
#15	Axle weight 0.5 kg / Bit gain (High Byte), AWH Weight=(AWH*256+AWL)*0.5
#16	Engine total hours of Operation, EH1
#17	Engine total hours of Operation, EH2
#18	Engine total hours of Operation, EH3
#19	Engine total hours of Operation, EH4 Accumulated time=((EH4*256*256*256)+(EH3*256*256)+(EH2*256)+EH1)*0.05
#20 | #27	Vehicle identification number, aabbccddeeffgghh (If the Vehicle ID contains more than 8 Bytes then #20~#27 are “00”, please use ATI command to request.
#20	aa
#21	bb
#22	cc
#23	dd
#24	ee
#25	ff
#26	gg
#27	hh
#28	Engine Percent Load At Current Speed (0~125 %)
#29 | #32	SW-version supported for trucks, Version number in the format ab.cd where this byte represents ASCII code #29 : “a” , #30: ‘b’, #31:’c’ , #32:’d’
#33 | #36	High Resolution Total Vehicle Distance, 5 m/bit, 0 to 21,055,406 km =((D4*256*256*256)+(D3*256*256)+(D2*256)+D1)*0.005 (KM)
#33	D1
#34	D2

<table>
<tr><td>#35</td><td>D3</td></tr>
<tr><td>#36</td><td>D4</td></tr>
<tr><td>#37
|
#38</td><td>The distance which can be traveled by the vehicle before the next service inspection is required
SERV=(V2*256+V1)*5-160635 (KM)</td></tr>
<tr><td>#37</td><td>V1</td></tr>
<tr><td>#38</td><td>V2</td></tr>
<tr><td>#39</td><td>
<table>
<tr><th>B7</th><th>B6</th><th>B5</th><th>B4</th><th>B3</th><th>B2</th><th>B1</th><th>B0</th></tr>
<tr><td colspan="2">Vehicle motion(B7,B6):
00 = Vehicle motion not detected
01 = vehicle motion detected</td><td colspan="3">Driv. 2 working stat state (B5,B4,B3)。G
000 = Rest
001 = Driver available
010 = Work
011 = Drive
110 = Error
111 = not available</td><td colspan="3">Driv. 1 working state (B2,B1,B0):
000 = Rest
001 = Driver available
010 = Work
011 = Drive
110 = Error
111 = not avaiable</td></tr>
</table>
</td></tr>
<tr><td>#40</td><td>
<table>
<tr><th>B7</th><th>B6</th><th>B5</th><th>B4</th><th>B3</th><th>B2</th><th>B1</th><th>B0</th></tr>
<tr><td colspan="2">Vehicle Overspeed</td><td colspan="2">Driver 1 card</td><td colspan="4">Driver 1 time related state</td></tr>
</table>
Vehicle Over speed (B7,B6)。GIndicates whether the vehicle is exceeding the legal speed limit set in the tachograph.
00 = No over speed
01 = Over speed Driver 1 card (B5,B4)
00 = Card not present
01 = Card present
Driver 1 time related state (B3,B2,B1,B0)。GIndicates if the driver approaches or exceeds working time limits (or other limits).
0000 = normal
0001 = 15 min bef. 4.5 h
0010 = 4.5 h reached
0011 = 15 min bef. 9 h
0100 = 9 h reached
0101 = 15 min bef. 16 h
0110 = 16h reached
1110 = Error
1111 = not available
</td></tr>
</table>

<table>
<tr><td>#41</td><td>
<table>
<tr><th>B7</th><th>B6</th><th>B5</th><th>B4</th><th>B3</th><th>B2</th><th>B1</th><th>B0</th></tr>
<tr><td colspan="2">NOT USED</td><td colspan="2">Driver 2 card (B5,B4)
00 = Card not present
01= Card present</td><td colspan="4">Driver 2 time related state (B3,B2,B1,B0)。
GIndicates if the driver approaches or exceeds working time limits (or other limits).
0000 = normal
0001 = 15 min bef. 4.5 h
0010 = 4.5 h reached
0011 = 15 min bef. 9 h
0100 = 9 h reached
0101 = 15 min bef. 16 h
0110 = 16h reached
1110 = Error
1111 = not available</td></tr>
</table>
</td></tr>
<tr><td>#42</td><td>
<table>
<tr><th>B7</th><th>B6</th><th>B5</th><th>B4</th><th>B3</th><th>B2</th><th>B1</th><th>B0</th></tr>
<tr><td colspan="2">Direction indicator</td><td colspan="2">Tachgraph performance</td><td colspan="2">Handling information</td><td colspan="2">System event</td></tr>
</table>
Direction indicator (B7,B6)。G
00 = Forward
01 = Reverse Tachgraph performance (B5,B4)
00 = Normal performance
01 = Performance analysis Handling information (B3,B2)
00 = no handling information
01 = handling information System event (B1,B0)
00 = no tachogr. Event
01 = tachogr. Event
</td></tr>
<tr><td>#43
|
#44</td><td>Tachogr. vehicle speed 1/256 km/h Bit gain
Speed= ((VS2*256)+VS1)/256</td></tr>
<tr><td>#43</td><td>VS1</td></tr>
<tr><td>#44</td><td>VS2</td></tr>
</table>

#45	Engine Coolant Temperature(ECT) , -40 to 210 deg C ECT=data-40°C
#46	Engine Turbocharger Boost Pressure(ETBP), 2 kPa/bit , 0~500 KPA ETPB=data *2 (KPA)
#47	Engine Intake Manifold 1 Temperature(EIMT) , -40 to 210 deg C EIMT=data-40°C
#48	Bit7,6 Anti-Lock Braking (ABS) Active。G 00 - ABS passive but installed 01 - ABS active 10 – Reserved 11 - Not available Bit5~Bit0: Resvered.
#49	Brake Pedal Position (BPP), 0.4 %/bit, 0~100% BPP=data*0.4 (%)
#50	Parking and/or Trailer Air Pressure(PTAP), 8 kPa/bit PTAP=data *8 (KPA)
#51	Service Brake Air Pressure Circuit #1 (SBAPC1), 8 kPa/bit SBAPC1=data*8 (KPA)
#52	Service Brake Air Pressure Circuit #2 (SBAPC2), 8 kPa/bit SBAPC2=data*8 (KPA)
#53	Parking Brake Switch 00 = Parking brake not set 01 = Parking brake set
#54	Bit 1 ,Bit 0: Diagnostics supported 00 = diagnostics is not supported 01 = diagnostics is supported 10 = reserved 11 = don´t care Bit 3 ,Bit 2: Requests supported 00 = request is not supported 01= request is supported 10 = reserved 11 = don´t care Bit4~Bit7:Resvered

#55 | #56	Ambient Air Temperature: Temperature of air surrounding vehicle. AAT=(AATH* 256+AATL)*0.03125 -273 deg C #55: AATL #56: AATH
#57	Door Control 1: Bit 7,Bit6: Status 2 of doors 00 = all bus doors disabled 01 = at least 1 bus door enabled 10 = error 11 = not available Bit 5, Bit4: Ramp/Wheel chairlift 00 = inside bus 01 = outside bus 10 = Error 11 = not available Bit 3,2,1,0 : Position of doors 0000 = at least 1 door is open 0001 = closing last door 0010 = all doors closed 1110 = Error 1111 = not available
#58 | #56	Door Control 2, #58~#65 Lock Status: locked→doors cannot be operated by the driver or a passenger unlocked→door may be operated by the driver or a passenger Open Status: closed→door is completely closed open→door is not completely closed Enable Status: disabled→door cannot be opened by a passenger enabled→door can be opened by a passenger

#58

B7	B6	B5	B4	B3	B2	B1	B0
Bit 7, Bit 6: Lock Status Door 2 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 5,Bit 4: Enable Status Door 1 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 3,Bit 2: Open Status Door 1 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 1,Bit 0: Lock Status Door 1 00 = Unlocked 01 = Locked 10 = Error 11 = Not available	

#59

B7	B6	B5	B4	B3	B2	B1	B0
Bit 7, Bit 6: Open Status Door 3 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 5, Bit 4: Lock Status Door 3 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 3, Bit 2: Enable Status Door 2 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 1, Bit 0: Open Status Door 2 00 = Closed 01 = Open 10 = Error 11 = Not available	

#60

B7	B6	B5	B4	B3	B2	B1	B0
Bit 7, Bit 6: Enable Status Door 4 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 5, Bit 4: Open Status Door 4 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 3, Bit 2: Lock Status Door 4 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 1, Bit 0: Enable Status Door 3 00 = Disabled 01 = Enabled 10 = Error 11 = Not available	

#61

B7	B6	B5	B4	B3	B2	B1	B0
Bit 7, Bit 6: Lock Status Door 6 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 5, Bit 4: Enable Status Door 5 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 3, Bit 2: Open Status Door 5 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 1, Bit 0: Lock Status Door 5 00 = Unlocked 01 = Locked 10 = Error 11 = Not available	

#62

B7	B6	B5	B4	B3	B2	B1	B0
Bit 7, Bit 6: Open Status Door 7 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 5, Bit 4: Lock Status Door 7 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 3, Bit 2: Enable Status Door 6 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit1, Bit 0: Open Status Door 6 00 = Closed 01 = Open 10 = Error 11 = Not available	

#63

B7	B6	B5	B4	B3	B2	B1	B0
Bit 7, Bit 6: Enable Status Door 8 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 5, Bit 4: Open Status Door 8 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 3, Bit 2: Lock Status Door 8 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit1, Bit 0: Enable Status Door 7 00 = Disabled 01 = Enabled 10 = Error 11 = Not available	

#64

B7	B6	B5	B4	B3	B2	B1	B0
Bit 7, Bit 6: Lock Status Door 10 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 5, Bit 4: Enable Status Door 9 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 3, Bit 2: Open Status Door 9 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit1, Bit 0: Lock Status Door 9 00 = Unlocked 01 = Locked 10 = Error 11 = Not available	

#65

B7	B6	B5	B4	B3	B2	B1	B0
Bit 3, Bit 2: Enable Status Door 10 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit1, Bit 0: Open Status Door 10 00 = Closed 01 = Open 10 = Error 11 = Not available					

#66 | #71

Time / Date:
#66 : Second=data * 0.25
#67 : Minutes=data
#68 : Hours=data
#69 : Month=data
#70 : Day=data * 0.25
#71 : Year=data-1985 (1985 to 2235 years)

#72

Alternator Status

B7	B6	B5	B4	B3	B2	B1	B0
Bit 7, Bit6: Alternator Status 4 00 = not charging 01 = charging 10 = error 11 = not available		Bit 5, Bit4: Alternator Status 3 00 = not charging 01 = charging 10 = error 11 = not available		Bit 3, Bit 2: Alternator Status 2 00 = not charging 01 = charging 10 = error 11 = not available		Bit 1, Bit 0: Alternator Status 1 00 = not charging 01 = charging 10 = error 11 = not available	

#73	Selected Gear = data -125negative gear are reverse gears 00000000 = neutral 11111011 = park
#74	Current Gear=data-125 negative gear are reverse gears 00000000 = neutral 11111011 = park
#75 | #76	Bellow Pressure Front Axle Left Information of the pressure of the air suspension bellow at the left side of the front axle Pressure= ((BPFAL2*256)+BPFAL1)* 0.1 ,KPA
#75	BPFAL1
#76	BPFAL2
#77 | #78	Bellow Pressure Front Axle Right Information of the pressure of the air suspension bellow at the left side of the front axle Pressure= ((BPFAR2*256)+BPFAR1)* 0.1 ,KPA
#77	BPFAR1
#78	BPFAR2
#79 | #80	Bellow Pressure Rear Axle Left Information of the pressure of the air suspension bellow at the left side of the front axle Pressure= ((BPRAL2*256)+BPRAL1)* 0.1 ,KPA
#79	BPRAL1
#80	BPFAR2
#81 | #82	Bellow Pressure Rear Axle Right Information of the pressure of the air suspension bellow at the left side of the front axle Pressure= ((BPRAR2*256)+BPRAR1)* 0.1 ,KPA

#81	BPRAL1
#82	BPFAR2
#83 | #90	Driver's Identification (Driver 1 & Driver 2 identification) #83 | #84 | #85 | #86 | #87 | #88 | #89 | #90 The driver ID is only available if a digital tachograph is present
#91 | #92	Engine Fuel Rate (EFR). Amount of fuel consumed by engine per liter of hour. EFR=(EFR2*256+EFR1)* 0.05 , L/h Data Range: 0 to 3,212.75 L/h
#91	EFR1
#92	EFR2
#93 | #94	Engine Instantaneous Fuel Economy(EIFE). Current fuel economy at current vehicle velocity. EIFE=(EIFE2*256+EIFE1) / 512 , km/L Data Range: 0 to 125.5 km/L
#95 | #102	FMS Tell Tale Status #95 | #96 | #97 | #98 | #99 | #100 | #101 | #102 The Tell Tale Status information is derived from information displayed to the driver's dashboard.
#95	Bit 3,2,1,0: Telltale Block ID Bit 7,6,5,4: Telltale Status 1 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available

#96	Bit 3,2,1,0: Telltale Status 2 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 3 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available
#97	Bit 3,2,1,0: Telltale Status 4 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 5 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available

#98	Bit 3,2,1,0: Telltale Status 6 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 7 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available
#99	Bit 3,2,1,0: Telltale Status 8 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 9 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available

#100	Bit 3,2,1,0: Telltale Status 10 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 11 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available
#101	Bit 3,2,1,0: Telltale Status 12 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 13 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available

#102	Bit 3,2,1,0: Telltale Status 14 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 15 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available

J1708 Packaged Messages Protocol

S

Once AT1708 SLEEP, it can wake it up.
Start to send data by 3 packing, response HEX CODE

Packing 1:	Packing 2:	Packing 3:
Byte 0: " @" , 0x40;	Byte 0: " @" , 0x40;	Byte 0: " @" , 0x40;
Byte 1: 4	Byte 1: 5	Byte 1: 6
Byte 2: #00	Byte 2: #18	Byte 2: #36
Byte 3: #01	Byte 3: #19	Byte 3: #37
Byte 4: #02	Byte 4: #20	Byte 4: #38
Byte 5: #03	Byte 5: #21	Byte 5: #39
Byte 6: #04	Byte 6: #22	Byte 6: #40
Byte 7: #05	Byte 7: #23	Byte 7: #41
Byte 8: #06	Byte 8: #24	Byte 8: #42
Byte 9: #07	Byte 9: #25	Byte 9: #43
Byte 10: #08	Byte 10: #26	Byte 10: #44
Byte 11: #09	Byte 11: #27	Byte 11: #45
Byte 12: #10	Byte 12: #28	Byte 12: #46
Byte 13: #11	Byte 13: #29	Byte 13: #47
Byte 14: #12	Byte 14: #30	Byte 14: #48
Byte 15: #13	Byte 15: #31	Byte 15: #49
Byte 16: #14	Byte 16: #32	Byte 16: #50
Byte 17: #15	Byte 17: #33	Byte 17: #51
Byte 18: #16	Byte 18: #34	Byte 18: #52
Byte 19: #17	Byte 19: #35	Byte 19: #53
Byte 20: Check sum = Byte2 + ..+Byte 19	Byte 20: Check sum = Byte2 + ..+Byte 19	Byte 20:Check sum = Byte2 + ..+Byte 19
Byte 21: 0X0D	Byte 21: 0X0D	Byte 21: 0X0D
Byte 22: 0X0A	Byte 22: 0X0A	Byte 22: 0X0A

Packing 4 & 5 will display only there is trouble code occurrence.

Packing 4:	Packing 5:	
Byte 0: " @"	Byte 0: " @"	
Byte 1: 7	Byte 1: 8	
Byte 2:a	Byte 2:a	
Byte 3:b	Byte 3:b	
Byte 4:c	Byte 4:c	
Byte 5:a	Byte 5:a	
Byte 6:b	Byte 6:b	
Byte 7:c	Byte 7:c	
Byte 8:a	Byte 8:a	
Byte 9:b	Byte 9:b	
Byte 10:c	Byte 10:c	
Byte 11:a	Byte 11:a	
Byte 12:b	Byte 12:b	
Byte 13:c	Byte 13:c	
Byte 14:a	Byte 14:a	
Byte 15:b	Byte 15:b	
Byte 16:c	Byte 16:c	
Byte 17: Check sum = Byte2 + ..+Byte 21	Byte 17: Check sum = Byte2 + ..+Byte 21	
Byte 18: 0X0D	Byte 18: 0X0D	
Byte 19: 0X0A	Byte 19: 0X0A	

a — MID
b — SID or PID of a standard diagnostic code.
C — Diagnostic code character.
Bits 4-1: Failure mode identifier (FMI)

NOTE : The #00~#52 command respond that data are ASCII code.

#00 | #01	Road Speed—Indicated vehicle velocity Maximum Range: 0.0 to 205.2 km/h (0.0 to 127.5 mph) speed=(SHB*256+SLB)/256
#00	Speed Low Byte (SLB)
#01	Speed High Byte (SHB)
#02	Cruise Control Status—State of the vehicle velocity control system (active, not active), and system switch (on, off), for various system operating modes. Bit 8: cruise mode 1=active/0=not active Bit 7: clutch switch 1=on/0=off Bit 6: brake switch 1=on/0=off Bit 5: accel switch 1=on/0=off Bit 4: resume switch 1=on/0=off Bit 3: coast switch 1=on/0=off Bit 2: set switch 1=on/0=off Bit 1: cruise control switch 1=on/0=off
#03	Brake Stroke Status—Identifies the current state of the vehicle foundation brakes. Bit 8-5: Axle number 1 to 16 (represented as 0 to 15) Bit 4-2: Brake status/Stroke adjustment 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 Bit 1: 1 = Left wheel, 0 = Right wheel

#04	Percent Accelerator Pedal Position(PAPP)—Ratio of actual accelerator pedal position to maximum pedal position. Maximum Range: 0.0 to 102.0% PAPP= Data* 0.4
#05 | #08	Total Fuel Used (Natural Gas)—Accumulated amount of fuel used during vehicle operation. Maximum Range: 0.0 to 2 147 483 648 kg (0.0 to 4 724 464 025 lb) TFU=((ETF4*256*256*256)+(ETF3*256*256)+(ETF2*256)+ETF1)*0.473
#05	Engine Total Fuel used 0473 L / Bit gain , ETF1
#06	Engine Total Fuel used 0,473 L / Bit gain , ETF2
#07	Engine Total Fuel used 0,473 L / Bit gain , ETF3
#08	Engine Total Fuel used 0,473 L / Bit gain , ETF4
#09	Fuel Level—Ratio of volume of fuel to the total volume of the primary fuel storage container. Maximum Range: 0.0 to 127.5% Fuel Level=FL * 0.5 %
#10 | #11	Engine Speed (RPM)—Rotational velocity of crankshaft. Maximum Range: 0.0 to 16383.75 rpm RPM= (RH*256+ RL)* 0.25
#10	RPM Low byte, RL
#11	RPM High byte, RH
#12	Engine Oil Pressure(EOP)—Gage pressure of oil in engine lubrication system as provided by oil pump. Maximum Range: 0.0 to 879.0 kPa (0.0 to 127.5 lbf/in2) EOP=data * 3.45 KPA
#13	Throttle Position(TP)—The position of the valve used to regulate the supply of a fluid, usually air or fuel/air mixture, to an engine. 0% represents no supply and 100% is full supply. Maximum Range: 0.0 to 102.0% TP= data * 0.4%

#14	Cargo Weight—The force of gravity of freight carried. Maximum Range: 0.0 to 1 166 056.9 N (0.0 to 262 140.0 lbf) (Low Byte),AWL
#15	(High Byte), AWH Weight=(AWH*256+AWL)* 17.792 N
#16	Total Engine Hours(TEH)—Accumulated time of operation of engine. Maximum Range: 0.0 to 214 748 364.8 h TEH=(((EH4*256*256*256)+(EH3*256*256)+(EH2*256)+EH1)*0.05
#16	Engine total hours of Operation, EH1
#17	Engine total hours of Operation, EH2
#18	Engine total hours of Operation, EH3
#19	Engine total hours of Operation, EH4
#20 | #27 #85 | #96	Vehicle Identification Number—Vehicle Identification Number (VIN) as assigned by the vehicle manufacturer. Vehicle identification number, aabbccddeeffgghh "ATI" command can show max 20 character VIN
#20	aa
#21	bb
#22	cc
#23	dd
#24	ee
#25	ff
#26	gg
#27	hh

#28	PTO Engagement Control Status PTO output status: Bits 8-5: Reserved—all bits set to 1 Bits 4-3: PTO #2 engagement actuator status Bits 2-1: PTO #1 engagement actuator status NOTE—Each status will be described using the following nomenclature: 00 Off/Not active 01 On/Active 10 Error condition 11 Not available
#29 | #30	Average Fuel Economy AFE=((AFE2*256)+AFE1) *1.660 72 x 10-3 km/L
#29	AFE1
#30	AFE2
#31 | #32	Mass Air Flow—Mass air flow measured at the fresh air intake MAF=((MAF2*256)+MF1)* 0.125 kg/min
#31	MAF1
#32	MAF2
#33 | #36	Total Vehicle Distance(TVD)—Accumulated distance travelled by vehicle during its operation. Maximum Range: 0.0 to 691489743 km (0.0 to 429 496 729.5 mi) Bit Resolution: 0.161 km (0.1 mi) TVD=((D4*256*256*256)+(D3*256*256)+(D2*256)+D1)*0.161 (KM) If vehicle dose not provide TVD, AT1708 replace the information with the calculated distance, deviation is 0.5%, The first time connection AT1708 please command ATR to clear distance memory.

#33	D1
#34	D2
#35	D3
#36	D4
#37 | #38	Fuel Rate (Instantaneous)—Amount of fuel consumed by engine per unit of time. Maximum Range: 0.0 to 1.076 65 L/s FR=(V2*256+V1) * 16.428 x 106 L/s
#37	V1
#38	V2
#39 | #40	Total Vehicle Hours(TVH)—Accumulated time of operation of vehicle. Maximum Range: 0.0 to 214 748 364.8 h TVH=((H4*256*256*256)+(H3*256*256)+(H2*256)+H1)*0.05 (H)
#39	H1
#40	H2
#41	H3
#42	H4
#43	Reserved
#44	Percent Engine Load(PEL)—Ratio of current output torque to maximum torque available at the current engine speed. Maximum Range: 0.0 to 127.5% PEL=data * 0.5%
#45	Engine Coolant Temperature(ECT) , Maximum Range: 0.0 to 255.0 °F ECT= data °F
#46	Boost Pressure (BP)—Gage pressure of air measured downstream on the compressor discharge side of the turbocharger. Maximum Range: 0.0 to 219.8 kPa (0.0 to 31.875 lbf/in2) PB=data * 0.862 (KPA)
#47	Intake Manifold Temperature (IMT)—Temperature of precombustion air found in intake manifold of engine air supply system. Maximum Range: 0.0 to 255.0 °F IMT=data °F
#48	ABS Control Status Bits 8-7: ABS off-road function switch Bits 6-5: ABS retarder control Bits 4-3: ABS brake control Bits 2-1: ABS warning lamp 00 Off/Not active 01 On/Active 10 Error condition 11 Not available
#49	Parking Brake Switch Status—Identifies the state (active/inactive) of the parking brake switch. Bit 8: 1=active/0=inactive Bits 7-1: Undefined
#50	Brake Application Pressure (BAP) Maximum Range: 0.0 to 1055 kPa (0.0 to 153.0 lbf/in2) BAP=data *4.14 kPa
#51	Brake Primary Pressure (BPP)—Gage pressure of air in the primary, or supply side, of the air brake system. Maximum Range: 0.0 to 1055 kPa (0.0 to 153.0 lbf/in2) BPP=data* 4.14 (KPA)
#52	Brake Secondary Pressure—Gage pressure of air in the secondary, or service side, of the air brake system. Maximum Range: 0.0 to 1055 kPa (0.0 to 153.0 lbf/in2) BPP=data* 4.14 (KPA)
#53	Road Speed Limit Status :State (active or not active) of the system used to limit maximum vehicle velocity. Bit 8: 1=active/0=not active Bits 7-1: Undefined

J1708 Command Example

1.) >AT#h,
Response: "Data1" "Data2" "H0D" "H3E" by ASCII CODE.
EX1:
AT#1, to get vehicle speed, if speed is 255,
Display,
FF
>
(H46,H46, H0D,H3E).

2.) Trouble code :
40 37 80 8 CA 80 A AA 80 B AA 80 C AA 80 1 AA FC D A
Trouble code :
MID 128(H80)
PID 8(H8)
Diagnostic code character (CA), FMI= A , bit4~bit1

4.) ATI : request vehicle ID,

2A	31	47	31	4A	46	32	37	57	37	47	4A	31	37	38	32	32	37	0	0	0	27	0D	0A
	1	G	1	G	F	2	7	W	8	G	J	1	7	8	2	2	7				CS		

Country Manufactured	1	U.S.A.(1 or 4), Canada (2), Mexico (3), Japan (J), Korea (K), England (S), Germany (W), Italy (Z)
Manufacturer	G	
Vehicle Type	1	
Vehicle Features	JF27W	
Accuracy Check Digit	8	
Model Year	G	1988 (J), 1989 (K), 1990 (L), 1991 (M), 1992 (N), 1993 (P), 1994 (R), 1995 (S), 1996 (T), 199 7(V), 1998 (W), 1999 (X), 2000 (Y), 2001(1), 2002 (2), 2003 (3).....
Production Plant	J	
Sequential Number	178227	The sequence of the vehicle for production as it rolled of the manufacturers assembly line.