Au SAE J1708/J1587 Simulator V1.00A User Manual

Rev. D

Au Group Electronics

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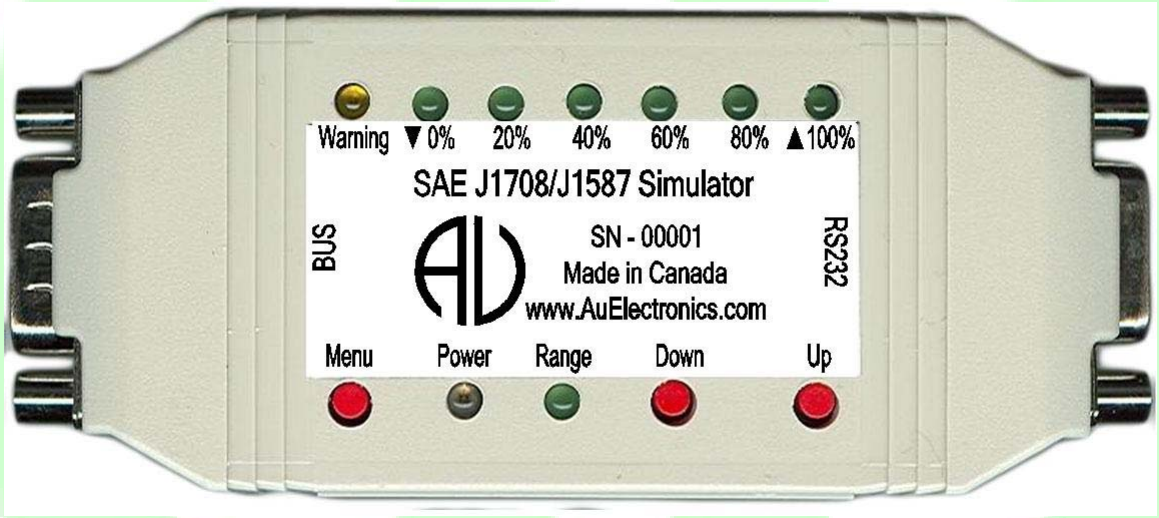

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Chapter 1 Introduction

Au SAE J1708/J1587 Simulators, a family of well designed devices(Figure 1-1), are capable of simulating most frequently used J1708/J1587 signals on the J1708/J1587 network. It is widely used for product development, validation, assembly-line testing, incoming inspection, and business demonstration, etc.

Figure 1-1

1.1 Typical SAE J1708 Topology with Au J1708/J1587 Simulators

A typical J1708 network topology with an Au J1708 simulator is illustrated in Figure 1-2.

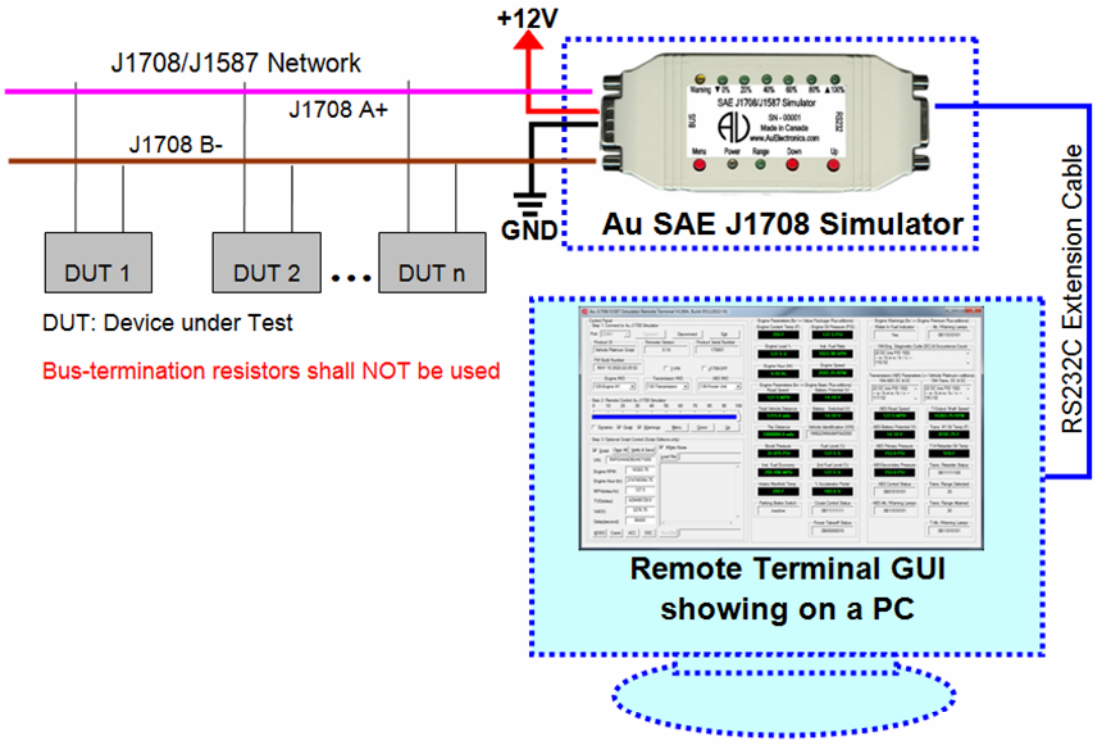


Figure 1-2

1.2 Major Hardware Features

- **Power supply:** +12V~+14.2V DC, 250mA max
- **J1708/J1587 Baud rate:** 9600 bits/second
- **Bit Access Time:** Per SAE J1708 Section 3.1 and Section 5.2.2.2
- **Inter-character bit time:** ≤ 2 bit time
- **Minimum Idle Time:** 10 bit time
- **Maximum network length:** 131 feet (40 meters)
- **Minimum capacity:** 20 standard nodes
- **Enclosure color:** Black or PC white
- **Compact size:** 4-1/8" L X 1-3/4"W X 7/8"H (10.5 X 4.2 X 2 cm)

- **Operating temperature:** -4 ˚F to 185 ˚F (-20 ˚C to 85 ˚C)
- **Ground:** All assemblies in the J1708 link must have Common Ground References
- **Wire:** A min. 18 AWG twisted-pair wire, with a min. of one twist/in (360˚/2.54 mm) is required
- **1 buzzer** Can be muted or enabled
- **9 LED indicators:** Power, Range, Warning*, ▼0%, 20%, 40%, 60%, 80%,▲100% . (Warning LED is not applicable in Value Package and Engine Basic Editions).
- **3 push buttons:** Simulated J1708 signals can be adjusted by push buttons: Menu, Down, Up
- **Bus Termination shall not be used per SAE J1708 Section 4.4.**
- **TVS (Transient Voltage Suppressor) protection on J1708 bus**
- **"BUS" side DB9 male Interface:** For power supply and J1708 network connection, pin-out of the DB9 male bus interface is illustrated in Figure 1-3.

Figure 1-3

- **RS232 side DB9 female interface:** For firmware update, license management, remote control (Plus and Script edition only). pin-out of the DB9 female connector is illustrated in Figure 1-4

Figure 1-4

Au J1708/J1587 Simulator can be connected to PC serial port through an RS232 serial extension cable (Part#: CBL-RS232-01), as shown in Figure 1-5.

Figure 1-5

For PCs with USB port, a USB to RS232 converter cable (Part#: CBL-USB-232) can be used (Figure 1-6).

Figure 1-6

The following cables and power supply are optional components for different applications. Sold separately.

CBL-CAN-485-01 	A 6-wire color-coded cable used for Au J1939 and Au J1708 devices. One end of the cable is a DB9 female connector, designed to mate with Au devices on the BUS side. The other side of the cable is a pigtail with 3 pairs of twisted color-coded wires: Red wire: Power supply, e.g. +12V DC Black wire: Ground Yellow wire: CAN High Green wire: CAN Low Violet: J1708A+ Brown: J1708B-
CBL-J1708-02 	Using the J1708 diagnostic cable (Part#: CBL-J1708-02) with an Au J1708 simulator will simulate SAE-J1708 signals and present the same diagnostic interface on trucks and school buses. One end is a DB9 female connector. It will supply power, ground, J1708A+, and J1708B- to Au J1708 devices or third-party devices. The other end includes an SAE 6-way rounded diagnostic receptacle with flange (Deutsch part #: HD10-6-12P) and a power jacket (2.1 mm positive center). The power jacket is compatible with part # PWR-912V-CP, which supplies power to all devices connected to the cable.
CBL-CAN-485-02D 	CBL-CAN-485-02D cable provides power supply, J1708/J1587 and CAN network connection similar to what's available on trucks, RVs and School buses. One end is a DB9 female connector, the other end are dual HD10 Serial 9-way SAE compatible Receptacles (green for 500K CAN baud rate and black for 250K CAN baud rate) . It also includes a power Supply Jacket (2.1 mm Positive center), which can supply power to all devices connected on the cable. For SAE J1939-11, J1939-14, 250Kbps and 500Kbps networks.
PWR-912V-CP 	Wall mount AC/DC power supply can supply power to all devices connected to CBL-J1708-02 or CBL-CAN-485-02D. ● Positive center ● Connector style: 2.1mm I.D. x 5.5mm O.D. x 12mm Female (compatible with the power jacket of CBL-J1708-02 and CBL-CAN-485-02) ● Voltage input: 110~120V AC Input ● Voltage output: 12V DC ● Current output: 500mA Max. ● Inrush current: 40A Maximum ● Power: 6.0W ● Line Regulation: +/- 2% ● Load Regulation: +/- 5%
CBL-RS232-01 	RS232 Serial extension cable can be used to connect computer Serial port to Au J1939 / J1708 products (on RS232 Side). ● Fully shielded to prevent unwanted EMI/RFI ● Fully molded connectors with thumbscrews provide a quick and easy connection every time ● Connectors: DB9 Male to DB9 Female ● All 9 connector pins are wired straight through
CBL-USB-232 	The USB to Serial Converter cable can be used to connect computer USB port to Au J1939 / J1708 products (on RS232 Side). It is Vista, XP, Win7, and Win10 compatible. Three LED (Power, TX and RX) are included. Power LED is on when USB power is supplied. TX LED will blink when COM port is transmitting. RX LED will blink when COM port is receiving. Compatible with all Au Group Electronics system products, J1939 Simulators, J1708 Simulators, FMS Simulators, NMEA2000 Simulators, J1939 /J1708 Interpreters, J1939/J1708 MCS, J1939/J1708 DCS, J1939/J1708 Gateways.

1.3 Major Operating Features

- Smart features: Recalls last operating mode at power-on, and capable of generating dynamic data
- Easy to use: No software setup experience or J1708 protocol configuration skill is required. After a network is connected, apply power and it will generate J1708 data when in dynamic mode.
- J1708 bus on/off switch
- Multiple MID to select from
- One VIN or multiple VIN switch
- Static mode or dynamic mode:
  - Static mode: Output static J1708 signals. In this mode, signal can be changed manually.
  - Dynamic mode: Automatically changes the output value of J1708 signals.
  - Two modes can be switched easily *(via press and hold both Menu and Up buttons until a long beep is heard)*
- PC Remote Terminal GUI:
  - Connects Au J1708 Simulator to a PC through serial communication.
  - Displays the simulator information, alters and displays simulator SA settings, and performs license upgrading.
  - Displays simulated J1708 signals on a computer screen for "Plus" editions and "Script" editions.
  - Provides script control capabilities for script editions.
- Script control capabilities (for "Script" editions only):
  - Capable of setting six parameters to any value in SAE J1939 specification allowed range, generating script, running script file. The script can be delayed, repeated, running with or without white noise.
- In-field license upgrade capability
- In-field firmware update capability
- Annual support and minor upgrade services are available (SVS-SIM-J1708)
- Custom firmware and GUI modification is available upon request

1.4 Eleven Editions of Au SAE J1708/J1587 Simulators

Eleven editions of Au SAE J1708 simulator are available: 4 Non-Plus editions, 4 Plus editions, and 3 Script editions.

1.4.1 Non-Plus Editions:

Au J1708 Simulator **non-plus** editions are stand-alone devices. They can be operated independently without a PC. A typical J1708 network topology with Au J1708 Simulator non-plus edition is illustrated in Figure 1-3. Full range of J1708/J1587 signals can be generated by controlling 3 push buttons.

1.4.2 Plus Editions:

Au J1708 Simulator **Plus** editions have all the functions of the Non-Plus editions, with the addition of a PC Remote Terminal program. Like the Non-Plus editions, all the Plus editions can still work independently without a PC.
The "Remote Terminal GUI" connects Au J1708 Simulator to a PC through serial communication. It displays the simulator product information, alters and displays the simulator settings, and performs license upgrading for all editions.
It also shows simulated J1708 signals on a computer screen for "Plus" editions and "Script" editions. Detail information can be found in chapter 4.

Plus Editions = Non-plus Editions + PC Remote Terminal GUI Program

1.4.3 Script Editions:

Au J1708 Simulator **Script** editions have all the functions of **Plus** editions, with the addition of **script control capabilities.** Detailed information is available in Chapter 4

Script Editions = Plus Editions + Script control capabilities

- Script control sets six parameters to any value in the SAE- J1708 specification allowed range: Engine RPM, Vehicle speed, VIN, Battery voltage, Engine hour, Total vehicle distance.
- Engine hour and Total vehicle distance can be set with initial values, then they will accumulate over time.
- Four buttons to generate frequently used script segments
- Script control can load and run a saved script file.

- The script can be delayed and repeated with or without white noise.
- Script control can switch J1708 bus on-off.
- Script control can be turned on/off with a click
- White noise can be turned on/off with a click.

1.5 Basic Functions of Each Edition

1.5.1 Value Package editions:

- "Statically" or "dynamically" generate 8 most frequently used engine PID
- 6 adjustable Engine Message ID
- Two push buttons (**Up** and **Down**) are used in "static mode" to adjust data outputs
- In "dynamic mode", data cycles automatically in its SAE defined range
- LED indicates the control step value and reflect push button operations
- Buzzer sound also reflects push button inputs, and can be enabled/disabled
- "Script" control capability is **NOT** available for Value Package Editions.

1.5.2 Engine Basic editions:

- Includes all Value Package edition functions
- "Statically" or "dynamically" generates 24 engine PID
- 6 adjustable Engine Message ID
- "Script" control capability is available for Engine Basic Script Edition

1.5.3 Engine Premium editions:

- Includes all Engine Basic edition functions
- "Statically" or "dynamically" generate 28 engine PID
- 6 adjustable Engine Message ID
- "Script" control capability is available for Engine Premium Script Edition

1.5.4 Vehicle Platinum editions:

- Includes all Engine Premium edition functions
- "Statically" or "dynamically" generate 45 Engine/Transmission/ABS PIDs Supported
- 6 adjustable Engine Message ID
- 3 adjustable Transmission Message ID
- 6 adjustable ABS Message ID
- "Script" control capability is available for Vehicle Platinum Script Edition

1.6 License Upgrade and Support

License upgrading flow chart for the all editions of SAE J1708 Simulator is summarized in Figure 1-7.

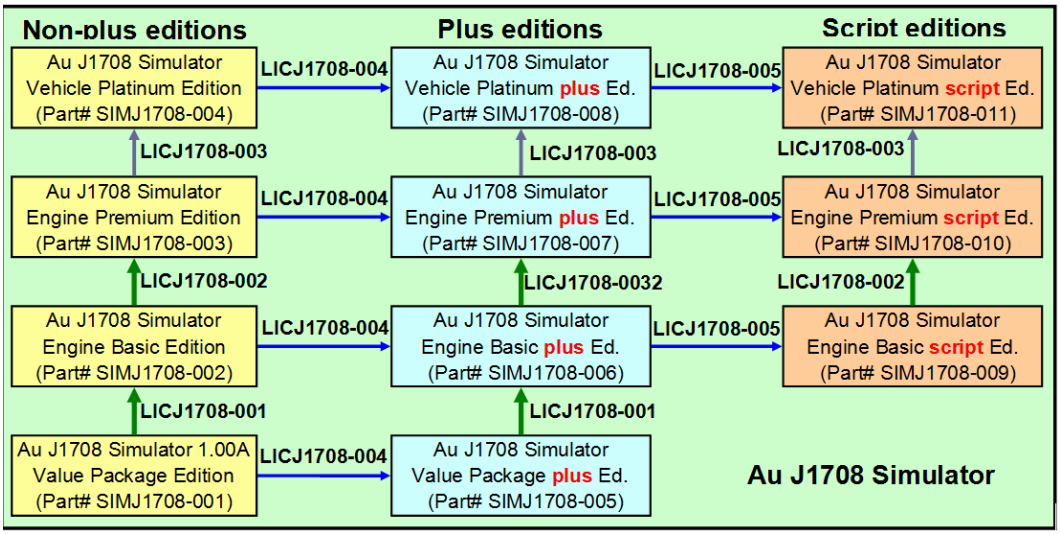


Figure 1-7

- Au J1708 Simulator license can be in-field upgraded to higher editions. "Au License Management" in the remote terminal GUI provides the in-filed license upgrading capability.
  - Value Package editions can be upgraded to Engine Basic editions (LICJ1708-001)
  - Engine Basic editions can be upgraded to Engine Premium editions (part #: LICJ1708-002).
  - Engine Premium editions can be upgraded to Vehicle Platinum editions (part #: LICJ1939-003).
  - "Non-Plus" editions are able to be upgraded to plus editions (part #: LICJ1708-004).
  - Engine Basic "Plus" editions and above are able to be upgraded to "Script" editions (part #: LICJ1708-005).
- Firmware can be in-field updated with Au PIC Boot-loader
- Firmware update codes or customized codes can be re-programmed to gain new or special features.
- Annual minor upgrades and supports service are available (SVS-SIM-J1708).

1.7 Order information

All of Au J1708/J1587 Simulators, accessories, and license upgrades are available to be ordered at the website for Au Group Electronic at: https://www.auelectronics.com/System-J1708Simulator.htm
Part numbers are listed in Table 1-1

Table 1-1 Part number list for Au J1708/J1587 Simulator, accessories, license upgrade code

Au SAE J1708 Simulator, Accessories, and Service		Part #
Non-Plus Edition	Au J1708 Simulator Value Package Edition	SIMJ1708-001
	Au J1708 Simulator Engine Basic Edition	SIMJ1708-002
	Au J1708 Simulator Engine Premium Edition	SIMJ1708-003
	Au J1708 Simulator Vehicle Platinum Edition	SIMJ1708-004
Plus Edition	Au J1708 Simulator Value Package Plus Edition	SIMJ1708-005
	Au J1708 Simulator Engine Basic Plus Edition	SIMJ1708-006
	Au J1708 Simulator Engine Premium Plus Edition	SIMJ1708-007
	Au J1708 Simulator Vehicle Platinum Plus Edition	SIMJ1708-008
Script Edition	Au J1708 Simulator Engine Basic Script Edition	SIMJ1708-009
	Au J1708 Simulator Engine Premium Script Edition	SIMJ1708-010
	Au J1708 Simulator Vehicle Platinum Script Edition	SIMJ1708-011
Accessories	6-wire cable for power supply and J1939/J1708 network connection	CBL-CAN-485-01
	4-wire Au J1708 diagnostic cable with DB9 female connector, HD10 Serial 6-way Receptacle and Power Jacket.	CBL-J1708-02
	CAN/J1939/J1708 cable equipped with a DB9 female connector, dual SAE 9-way Receptacles (green for 500K and black for 250K CAN baud rate) and a power Jacket	CBL-CAN-485-02D
	14V Wall mount AC/DC power supply, positive center, 110V input	PWR-912V-CP
	RS232 Serial Extension Cable (for computer with RS232 port)	CBL-RS232-01
	USB to RS232 Serial Convert Cable (for computer with USB port)	CBL-USB-232
Service	1 year support and minor upgrades for Au J1708 Simulator	SVS-SIM-J1708
License Upgrade	From Value Package Edition to Engine Basic Edition	LICJ1708-001
	From Engine Basic Edition to Engine Premium Edition	LICJ1708-002
	From Engine Premium Edition to Vehicle Platinum Edition	LICJ1708-003
	From Non-Plus Edition to Plus Edition	LICJ1708-004
	From Plus Edition to Script Edition	LICJ1708-005

Chapter 2 Supported SAE J1708 Parameters

Each edition has a different list of supported PID parameters and MID.

2.1 Value Package Edition(s)

- "Script" control capability is **NOT** available for Value Package Editions
- **6 adjustable Engine Message ID:**
  128 (Engine #1) 175 (Engine #2) 183 (Engine #3)
  184 (Engine #4) 185 (Engine #5) 186 (Engine #6)
- **8 Supported Engine PID parameters (default: TX only):**
  - Request Parameter (PID: 0, RX only)
  - Component-Specific Request (PID: 128, RX only)
  - Percent Engine Load (PID: 92)
  - Engine Oil Pressure (PID: 100)
  - Engine Coolant Temperature (PID: 110)
  - Fuel Rate (Instantaneous) (PID: 183)
  - Engine Speed (PID: 190)
  - Engine Hour* (PID: 247); (* On Request per SAE J1587 definition)

2.2 Engine Basic Edition(s)

- "Script" control capability is available for Engine Basic Script edition
- **6 adjustable Engine Message ID:**
  128 (Engine #1) 175 (Engine #2) 183 (Engine #3)
  184 (Engine #4) 185 (Engine #5) 186 (Engine #6)
- **24 supported Engine PID parameters:**
  - Includes all 8 parameters supported by value package edition
  - Engine Basic parameters (16):
  - Second Fuel Level (Right Side) (PID: 38)
  - Parking Brake Switch Status (PID: 70)
  - Road Speed (MPH) (PID: 84)
  - Cruise Control Status (PID: 85)
  - Power Takeoff Status (PID: 89)
  - Percent Accelerator Pedal Position (PID: 91)
  - Fuel Level (PID: 96)
  - Boost Pressure (PID: 102)
  - Engine Intake Manifold Temperature (PID: 105)
  - Battery Potential (Voltage), Switched* (PID: 158); (* On Request per SAE J1587 definition)
  - Battery Potential (Voltage) (PID: 168)
  - Instantaneous Fuel Economy (PID: 184)
  - Vehicle Identification Number* (PID: 237) (* On Request per SAE J1587 definition)
  - Trip Distance (PID: 244)
  - Total Vehicle Distance (PID: 245)
  - System Diagnostic Code and Occurrence Count Table (No warning code, heart beat only) (PID: 194)

2.3 Engine Premium Edition(s)

- "Script" control capability is available for Engine Premium Script edition
- **6 adjustable Engine Message ID:**
  128(Engine #1) 175(Engine #2) 183 (Engine #3)
  184 (Engine #4) 185 (Engine #5) 186 (Engine #6)
- **28 Engine PID Parameters Supported:**
  - Includes all 24 parameters supported by Engine Basic edition
  - Engine Premium parameters (4):
  - Attention/Warning Indicator Lamps Status (PID: 44)
  - Water in Fuel Indicator (PID: 97)
  - Transmitter System Diagnostic Code and Occurrence Count Table (PID: 194)
  - Multi-section Parameter (PID: 192)

2.4 Vehicle Platinum Edition(s)

- "Script" control capability is available for Vehicle Platinum Script edition
- **6 adjustable Engine Message ID:**
  128 (Engine #1) 175 (Engine #2) 183 (Engine #3)
  184 (Engine #4) 185 (Engine #5) 186 (Engine #6)
- **3 adjustable Transmission Message ID:**
  130(Transmission) 176(Additional Transmission) 223(Shift-Console, Primary)
- **6 adjustable ABS Message ID:**
  136 (Power Unit) 137 (Trailer #1) 138 (Trailer #2)
  139 (Trailer #3) 246 (Trailer #4) 247 (Trailer #5)
- **45 Engine/Transmission/ABS PIDs Supported:**
  - Includes all 28 parameters supported by Engine Premium edition
  - Vehicle Platinum parameters (17):
- 8 Supported ABS PID list (default: TX only):
  - ABS Road Speed (PID: 84)
  - Battery Potential (Voltage) (PID: 168)
  - Brake Primary Pressure (PID: 117)
  - Brake Secondary Pressure (PID: 118)
  - ABS Control Status (PID: 49)
  - Attention/Warning Indicator Lamps Status (PID: 44)
  - Multi-section Parameter (PID: 192)
  - Transmitter System Diagnostic Code and Occurrence Count Table (PID: 194)
- 9 Supported Transmission PID list (default: TX only):
  - Transmission Output Shaft Speed (PID: 191)
  - Hydraulic Retarder Oil Temperature (PID: 120)
  - Retarder Status (PID: 47)
  - Transmission #1 Oil Temperature (PID: 177)
  - Transmission Range Selected (PID: 162)
  - Transmission Range Attained (PID: 163)
  - Attention/Warning Indicator Lamps Status (PID: 44)
  - Multi-section Parameter (PID: 192)
  - Transmitter System Diagnostic Code and Occurrence Count Table (PID: 194)

Chapter 3 Operating Instructions

All editions of Au SAE J1708/J1587 Simulators can be operated by just controlling 3 push buttons. It generates SAE J1708/J1587signals for product developers, testers, operators and manufacturers.

3.1 Power On

Mate the DB9 female connector of a 6-wire cable (Part#: CBL-CAN-485-01) to the **BUS** side of Au J1708/J1587 Simulator DB9 male connector, connect the **Red** wire to +12 ~ +14.2V DC power supply, **Black** wire to ground, **Purple** wire to *J1708A+,* **Brown** wire to *J1708B-*. The **Power** LED on the simulator will light up, and the simulator will resume the last saved operating mode (static mode or dynamic mode).

3.2 Operating Modes (Static/Dynamic)

After power on, Au J1708/J1587 Simulator will work in either **static** mode or **dynamic** mode.

- **Static mode**: Au J1708/J1587 Simulator generates steady J1708 signals. In this mode, two push buttons (**Up** and **Down**) can be used to change the data outputs. When no button is pushed, all data will remain at the last value.
- **Dynamic mode**: The value of all data will change automatically every second in SAE J1587 defined range.
- Switch between dynamic mode and static mode: press and hold both **Menu** and **Up** buttons until a long beep is heard (if buzzer is enabled); or both the "▼0% LED" and the "▲100% LED" flip their status (from on to off or vice versa)

3.3 Functions of Push Buttons and LED Indicator

There are 3 push buttons (**Menu**, **Down**, **Up**) and 9 LEDs (Figure 3-1) on each Au J1708 Simulator device. Each LED is named after its function.

Figure 3-1

Note: Warning function is not applicable in Value Package Editions and Engine Basic Editions.

The push button functions are summarized in Table 3-1.

Table 3-1 Summary of push button functions on Au J1708 Simulator

Push Button Operation	Function
Press **Down** button	Decrease all simulated data until they reach the lowest value
Press **Up** button	Increase all simulated data until they reach the highest value
Press **Menu** button	Warnings ON/Off control for Engine Premium and Vehicle Platinum edition. (Not applicable for Value Package or Engine Basic editions)
Press & hold **Down** + **Up** button	Buzzer ON / OFF control
Press & hold **Menu** + **Up** button	Switch between Static / Dynamic mode
Press & hold **Menu** + **Up** + **Down** button	Switch On/Off J1708 bus

All simulated J1708 data can be changed within the SAE J1708/j1587 protocol defined range from 0 to 100 control steps (named 0% to 100% control step value from now on). 6 LED are used to identify the control step value in the range of 0%, 20%, 40%, 60%, 80%, and 100%.
The control step value vs. LED indicator status is summarized in Table 3-2.

Table 3-2 Control step value vs. LED indicator status (in Static Mode)

Step	Operation	LED Status
1	Connect **+12~+14.2 V DC** power supply	**Power, Range** LED on, other LED recall the last saved status at Static mode
2	Press **Down** button	**▼0%** LED on/off
3	Continue press **Down** button until control step = 0%	**▼0%** LED blink
4	Press **Up** button	**▲100%** LED on/off
5	Continue press **Up** button for control step 1 to 19%	**Power, Range** LED constant on
6	Continue press **Up** button for control step = 20%	**Power, Range** LED on, **20%** LED Blink
7	Continue press **Up** button for control step 21 to 39%	**Power, Range** LED on, **20%** LED on
8	Continue press **Up** button for control step = 40%	**Power, Range, 20%** LED ON, **40%** LED Blink
9	Continue press **Up** button for control step 41 to 59%	**Power, Range, 20%, 40%** LED on
10	Continue press **Up** button for control step = 60%	**Power, Range, 20%, 40%** LED on, **60%** LED blink
11	Continue press **Up** button for control step from 61 to 79%	**Power, Range, 20%, 40%, 60%** LED on
12	Continue press **Up** button for control step = 80%	**Power, Range, 20%,40%, 60%** LED on, **80%** LED blink
13	Continue press **Up** button for control step from 81 to 99%	**Power, Range, 20%, 40%, 60%, 80%** LED on
14	Continue press **Up** button for control step = 100%	**Power, Range, 20%, 40%, 60%, 80%** LED on, **▲100%** blink
15	Press & hold **Menu** + **Up** + **Down** to switch J1708 bus on/off	**▼0%, ▲100%, Range** LED blink

The following paragraph will explain how to use the Remote Terminal GUI (Graphic User Interface) to remote control the J1708/J1587 Simulator plus edition.

Chapter 4 Au J1708 Simulator Remote Terminal GUI

The Remote Terminal Graphic User Interface(GUI) includes a control panel and a display panel. The control panel is located on the left side, while the display panel is located on the right side. The display panel is applicable for "Plus" editions and "Script" editions of Au J1708 Simulator. It displays engine, ABS, Transmission information, warning lamp, etc. as shown in Figure 4-1.

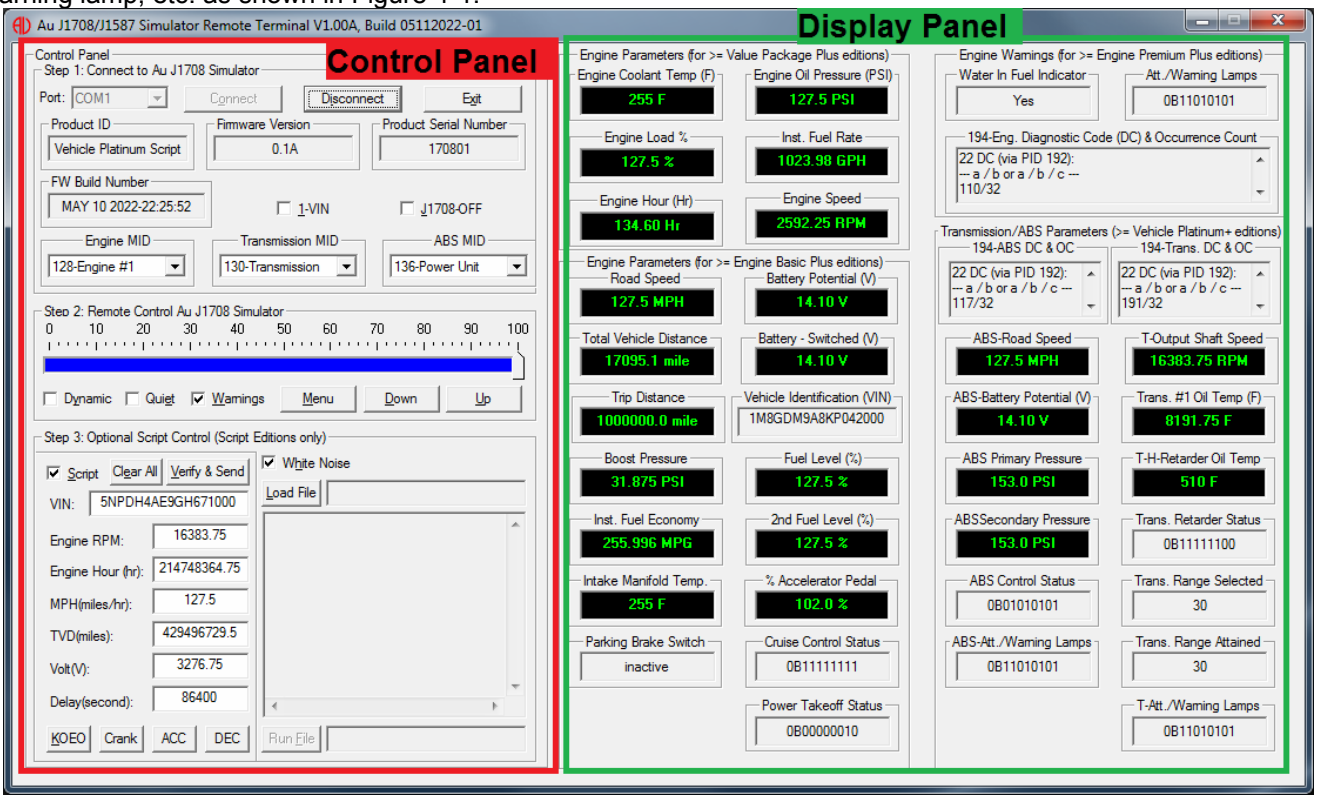


Figure 4-1

4.1 Step 1: Connect J1708/J1587 Simulator to PC and J1708 network

Typical connection of Au J1708 Simulator in a J1708 network is illustrated in Chapter 1, Figure 1-3.

a. Connect the J1708 simulator to power supply and a J1708 network on the BUS side,
b. Connect the J1708 simulator to a PC on the RS232 side. (Two options are available for connecting a J1708 Simulator to PC, please refer to Figure 1-5 and Figure 1-6 in Chapter 1.)
c. On the Remote Terminal GUI, select serial port from the "Port" drop down list.
d. Click "Connect"

Product information of the connected J1708 simulator device, such as Product ID, Firmware Version, Serial Number, and FW Build number will show up. 1-VIN switch, J1708-OFF switch, and MID settings will recall the last saved status. as shown in Figure 4-2.

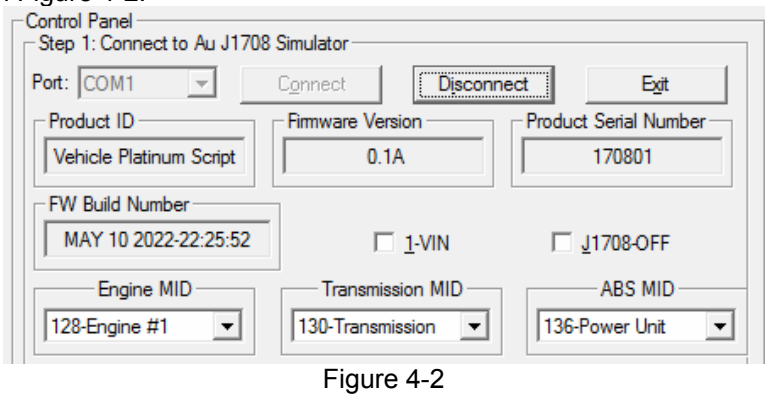


Figure 4-2

Note: Control panel step 1 is available for all Au J1708/J1587 Simulators (Non-Plus, Plus and Script editions).

4.1.1 Device Information

The function of step 1 control items is summarized in Table 4 -1.

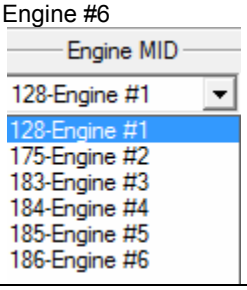
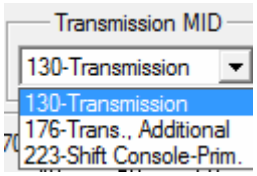
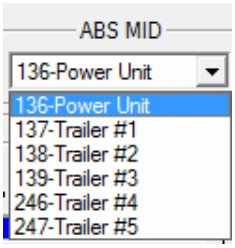
Table 4-1 Function summary of step 1 control items

Items	Function
Port	Serial port can be selected from drop down list (COM1 to COM30)
Connect	Connects Au J1708 Simulator with selected PC serial port.
Disconnect	Releases the selected PC serial port.
Exit	Closes the J1708 Simulator Remote Terminal program
Product ID	Displays the current edition of J1708/J1587 Simulator that's hooked up with the serial port. (*J1708 Simulator Engine Premium Plus Edition* is demonstrated in Figure 3-2)
Firmware Version	Displays the current firmware version of J1708 Simulator that's hooked up with the serial port. (The version of J1708 Simulator demonstrated in Figure 3-2 is *0.1A*)
Product Serial Number	Displays the serial number of J1708 Simulator that's hooked up with the serial port. (The serial number of J1708 Simulator demonstrated in Figure 3-2 is 197801)
FW Build Number	Displays the firmware build number. (FW is MAY 10 2022-22:25:52)
1-VIN	If checked, VIN will be a fixed VIN, if unchecked, VIN changes as control step changes.
J1708-OFF	If checked, J1708 network will be turned off, *Script command "AT J1708BUS=0"* if unchecked, J1708 network will be turned on. *Script command "AT J1708BUS =1"*

4.1.2 Message ID (MID) Settings

- Default engine MID is 128, other engine MID can be selected from the drop-down list.
- Default transmission MID is 130, other engine source addresses can be selected from the drop-down list.
- Default ABS source address is 136, other engine source addresses can be selected from the drop-down list.

Table 4 - 2 Available MID for Au J1708 Simulator

Engine MID	Transmission MID	ABS MID
6 Engine MID are available to choose from: 128 - Engine #1 175 - Engine #2 183- Engine #3 184- Engine #4 185- Engine #5 186- Engine #6	3 Engine MID are available to choose from: 130 - Transmission 176 - Transmission Additional 223- Shift Console-Prim.	6 Engine MID are available to choose from: 136 - Power Unit 137- Trailer #1 138- Trailer #2 139- Trailer #3 246 - Trailer #4 247- Trailer #5
		

4.2 Step 2: Remote Control Au J1708 Simulator

Remote control includes a scale bar, 3 check boxes (**Dynamic, Quiet, Warning**), and 3 push buttons (**Menu**, **Down**, **Up**), as shown in Figure 4-3.

Figure 4-3

These tools can be used to remote control the output/simulated signals of Au J1708 Simulator **Plus** edition and **Script** editions from a PC.
The **scale bar** represents the control step values from 0 to 100. The sliding action can be made by 4 methods: keyboard, mouse, Down/Up push button from remote terminal, or the Down/Up push button on the device. They are summarized in Table 4-3

Table 4-3 Control methods for scale bar

	Action	Function
Mouse	Left click	Left click to bring the slide to the desire location.
	Drag	Click and hold left button to drag the slide to desire location
Keyboard	▲ or ►	Increase the scale range by 1 interval
	▼ or ◄	Decrease the scale range by 1 interval
	pg up	Increase the scale range by 10 interval
	pg dn	Decrease the scale range by 10 interval
Remote terminal / Device	"Down" button	Decrease the scale range by 1 interval
	"Up" button	Increase the scale range by 1 interval

The functions of the push buttons and check boxes are listed in Table 4-4

Table 4-4 Functions for push buttons and check boxes in step 2 (Remote Terminal)

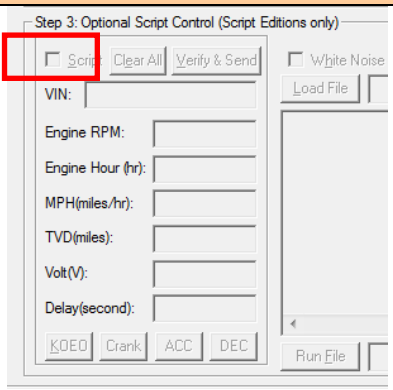
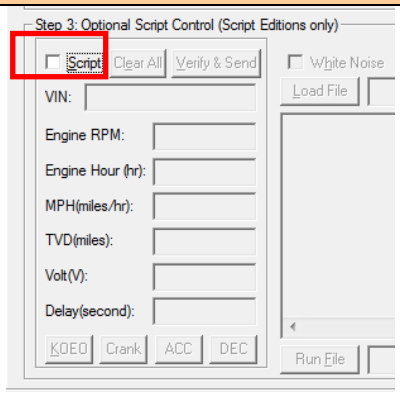
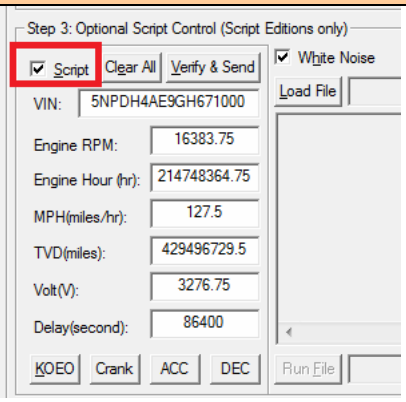
Tool		Function
Push Button	Menu	Turn on/off warning (see note below)
	Down	Decrease the control step value in 1
	Up	Increase the control step value in 1
Check box	Dynamic	Switch between dynamic mode / static mode
	Quiet	Turn on/off buzzer
	Warning	Turn on/off Eng/ABS/Trans Warnings, Diagnostic codes and occurrence count

Note: Menu button is active only in the **Engine Premium Plus** edition and **Vehicle Platinum Plus** edition.

4.3 Control Panel – Step 3: Script control

4.3.1 Turn On Script control

Table 4-5 Script Control

Script control is not available	Script control is turned off	Script control is turned on
		
Script check box is inactive, all parameters controlled by step control	Script check box is active but unchecked, all parameters controlled by step control	6 parameters controlled by Script control inputs, all other parameters controlled by step control

- Script control capabilities are available for 3 script editions only: Engine Basic Script Edition, Engine Premium Script Edition, and Vehicle Platinum Script Edition.
- When Script control is available, it can be switched on/off. When script control is not available or is turned off, all supported J1708 parameters are controlled by the step value.
- When script control is turned on, six J1708 parameters will be controlled by the input value of script control, all other J1708 parameters will still be controlled by step value.

4.3.2 Generate Script Command

- When script control is enabled, 6 parameters will be controlled by script control, the maximum allowed values will be showing in its input area respectively.
- Clicking the "Clear All" button will clear all values in the input area, it has no effect on the simulator .
- Change the inputs to a desire value.
- Clicking the "Verify & Send" button will send script command to J1708 Simulator, whose value change will be reflected on the display panel.
- Script command can be copied as part of a script file, which can be saved and run at later time.

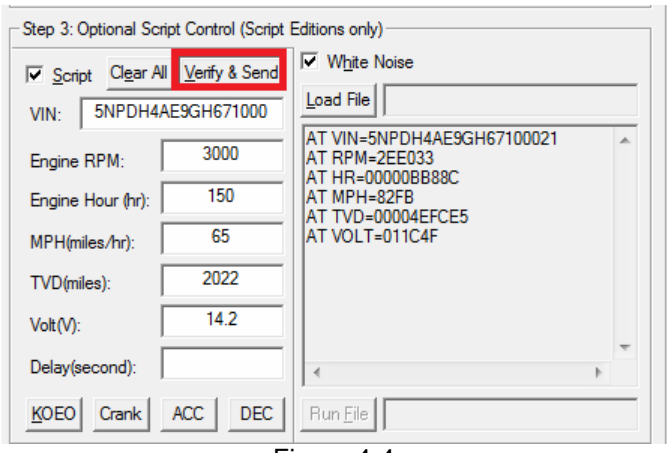


Figure 4-4

Values of the following 9 parameters change per script command accordingly

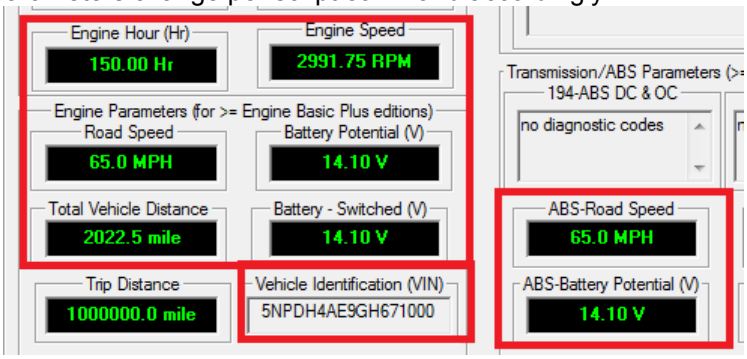


Figure 4-5

Input value of each parameter must be valid within the following range, which will be verified and send when "Verify & Send" button is clicked. If you have no desire to change a particular parameter, simply leave the input area blank.

Table 4-6 Valid input values of script controlled parameters

Script Controlled Parameters	Min. Input Value	Max. Input Value
VIN	VIN must consist of 17 characters	
Engine RPM	0	16383.75
Engine Hour (hours)	0	214748364.75
MPH (mile/hour)	0	127.5
TVD (Total Vehicle Distance) (miles)	0	429496729.5
Voltage (volts)	0	3276.75
Delay (seconds)	1	86400 (24 hours)

- Delay is the time that specifies how many seconds to wait before running another script command. If delay time is not set, all script commands will run once and then remain at those values except for Engine Hour and TVD.
- The input of Engine hour and Total vehicle distance will change their initial values, both Engine Hour and Total Vehicle Distance will accumulate over time.

4.3.3 Script Syntax for Au J1708 Simulator

- Each line of script end with \r\n
- All line comment are preceded by a semicolon (;)
- Always use the script commands generated by Au J1708 Simulator Script generator as any other script may not work properly. For example, the script generated from Au J1939 Simulator will not work for Au J1708 Simulator and vice versa.

Table 4-7 Script Syntax for Au J1708 Simulator

Keyword	Script command Syntax and Format	Example
;	Line comments are preceded by a semicolon (;)	;Cranking Profile
J1708BUS	J1708 bus on/off control 0: J1708 bus is off, 1: J1708 bus is on	AT J1708BUS=0 AT J1708BUS =1
WHITENOISE	White noise on/off control 0: white noise is off, 1: white noise is on	AT WHITENOISE=0 AT WHITENOISE=1
RPM	AT RPM=aabbefn\r\n - script command to set Engine Speed	AT RPM=2EE033
MPH	AT MPH=aaef\r\n - script command to set Vehicle Speed	AT MPH=82FB
VOLT	AT VOLT=aabbef\r\n - script command to set Battery voltage	AT VOLT=011C4F
TVD	AT TVD=aabbccddef\r\n - command to set Total vehicle Distance	AT TVD=00004EFCE5
HR	AT HR=aabbccddef\r\n - script command to set Engine Hour	AT HR=00000BB88C
VIN	AT VIN=abcd... - script command to set VIN (17 characters)	AT VIN=5NPDH4AE9GH67100021
DELAY	DELAY(t) -- The last status will stay unchanged for t seconds	DELAY(1)

REPEAT	REPEAT(n){ ...}
	script commands enclosed between a pair of bracelets will repeat for n times
		REPEAT(5){
		... ...
		}

4.3.4 Example of script command segments

To help form a script file, Script control also provides 4 buttons that generate 4 most commonly used script command segments. These segments can be copied and modified, then saved as a script file with extension "txt".

Table 4-8 Script Command Segments

KOEO	Crank	ACC (MPH accelerating)	DCC (MPH decelerating)

;KOEO Profile
;==========
;Turn off J1708 bus
;AT J1708BUS=0
;==========
;Turn on J1708 bus
;AT J1708BUS=1
;==========
;Turn on White Noise
;AT WHITENOISE=1
;==========
;Turn off White Noise
;AT WHITENOISE=0
;==========
;Repeat block function for 5 times
;Repeat feature can be nested up to 10 levels
REPEAT(5){
... ...
}
;==========
;Key On Engine Off. RPM=0; MPH=0; Volt=12.6V;
;==========
AT RPM=0000F5
AT MPH=009C
AT VOLT=00FC0E
;==========
	;==========
	;Cranking Profile
	;==========
	;MPH=0
	AT MPH=009C
	;==========
	;RPM=0, Volt=12.6V, delay 1s,
	AT RPM=0000F5
	AT VOLT=00FC0E
	DELAY(1)
	;==========
	;RPM=400, Volt=11.4V, delay 1s,
	AT RPM=064055
	AT VOLT=00E40F
	DELAY(1)
	;==========
	;RPM=800, Volt=4.2V, delay 1s,
	AT RPM=0C8044
	AT VOLT=005400
	DELAY(1)
	;==========
	;RPM=1200, Volt=13.8V, delay 1s,
	AT RPM=12C094
	AT VOLT=011430
	DELAY(1)
	;==========
	;RPM=650, Volt=14.2V, delay 1s,
	AT RPM=0A2844
	AT VOLT=011C4F
	DELAY(1)
	;==========
		;==========
		;Accelerate Profile
		;==========
		;RPM=650, MPH=0, delay 1s,
		AT RPM=0A2844
		AT MPH=009C
		DELAY(1)
		;==========
		;RPM=880, MPH=8, delay 1s,
		AT RPM=0DC083
		AT MPH=108C
		DELAY(1)
		;==========
		;RPM=1110, MPH=16, delay 1s,
		AT RPM=115805
		AT MPH=207C
		DELAY(1)
		;==========
		;RPM=1340, MPH=24, delay 1s,
		AT RPM=14F044
		AT MPH=306C
		DELAY(1)
		;==========
		;RPM=1570, MPH=32, delay 1s,
		AT RPM=188864
		AT MPH=405C
		DELAY(1)
		;==========
		;RPM=1800, MPH=40, delay 1s,
		AT RPM=1C2094
		AT MPH=504C
		DELAY(1)
		;==========
		;RPM=2030, MPH=48, delay 1s,
		AT RPM=1FB8E2
		AT MPH=603C
		DELAY(1)
		;==========
			;==========
			;Decelerate Profile
			;==========
			;RPM=2500, MPH=65, delay 1s,
			AT RPM=271055
			AT MPH=82FB
			DELAY(1)
			;==========
			;RPM=2260, MPH=56, delay 1s,
			AT RPM=235055
			AT MPH=702C
			DELAY(1)
			;==========
			;RPM=2030, MPH=48, delay 1s,
			AT RPM=1FB8E2
			AT MPH=603C
			DELAY(1)
			;==========
			;RPM=1800, MPH=40, delay 1s,
			AT RPM=1C2094
			AT MPH=504C
			DELAY(1)
			;==========
			;RPM=1570, MPH=32, delay 1s,
			AT RPM=188864
			AT MPH=405C
			DELAY(1)
			;==========
			;RPM=1340, MPH=24, delay 1s,
			AT RPM=14F044
			AT MPH=306C
			DELAY(1)
			;==========
			;RPM=1110, MPH=16, delay 1s,
			AT RPM=115805
			AT MPH=207C
			DELAY(1)
			;==========

		;RPM=2260, MPH=56, delay 1s, *AT RPM=235055* *AT MPH=702C* *DELAY(1)* *;==========* *;RPM=2500, MPH=65, delay 1s,* *AT RPM=271055* *AT MPH=82FB* *DELAY(1)* *;==========*	*;RPM=880, MPH=8, delay 1s,* *AT RPM=0DC083* *AT MPH=108C* *DELAY(1)* *;==========* *;RPM=650, MPH=0, delay 1s,* *AT RPM=0A2844* *AT MPH=009C* *DELAY(1)* *;==========*

4.3.5 Run script from a file

- Click "Load File" to load a script file

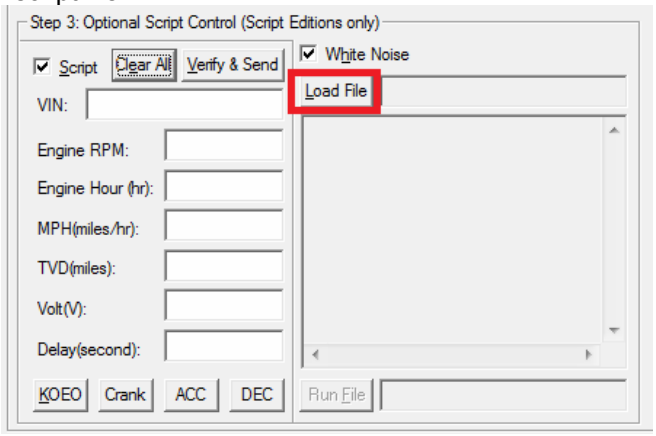


Figure 4-6

- Select a desired script file, then click "Open"

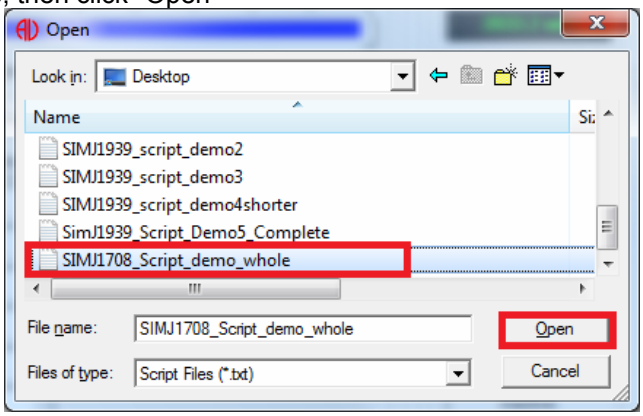


Figure 4-7

- Loaded script file name will be displayed near the top right corner, while script commands from the script file will be displayed in the script view-port. Click "Run File" button to run the script file.

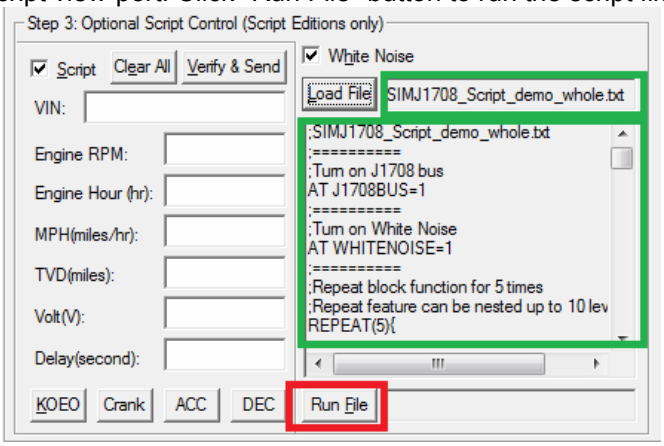


Figure 4-8

- The current running script command will be highlighted in the script view-port. Script running status will be displaying near the bottom right corner (for example, current command is delay, delay counting down timer is showing)

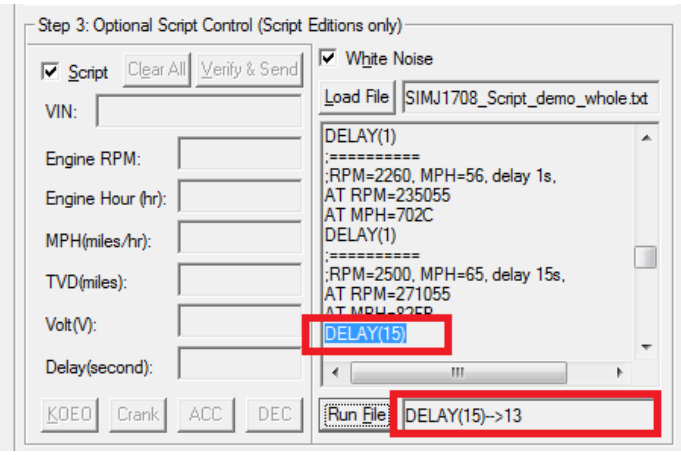


Figure 4-9

- When finished running, the last command of the script file will be highlighted. "Script Finished Successfully" message will be showing as the running status.

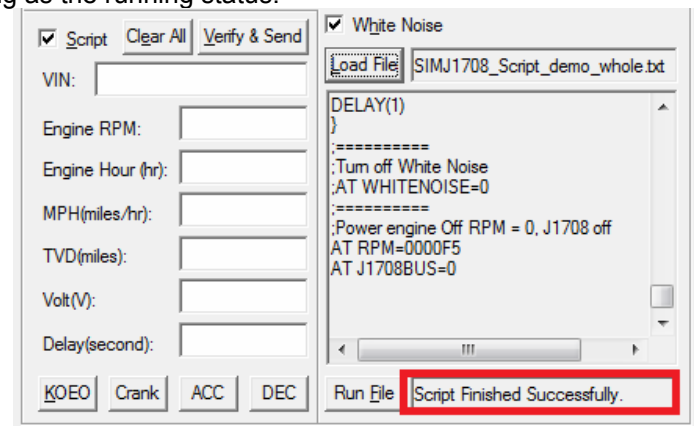


Figure 4-10

4.4 Display Panel - Engine Parameters for Value Package Plus Edition

Value package Plus editions of Au J1708 Simulator displays 6 engine parameters on the GUI:

- Engine speed (PID 190)
- Engine oil pressure (PID 100)
- Engine coolant temperature (PID 110)
- Percent engine load (PID 92)
- Fuel rate (Instantaneous) (PID 183)
- Total engine hour (On Request) (PID247)

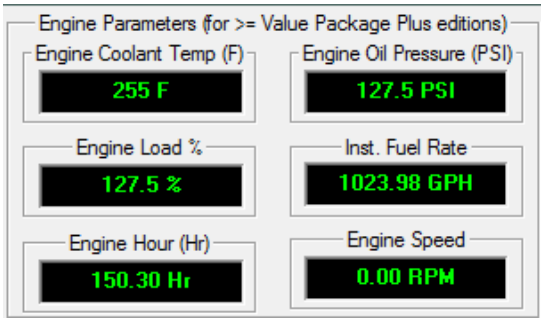


Figure 4-11

4.5 Display Panel - Engine Parameters for Engine Basic Plus and Script editions

Engine Basic Plus and Script editions of Au J1708 Simulator displays 21 engine parameters on the GUI:

6 value package parameters
+
15 engine basic parameters:

- Road Speed (MPH) (PID: 84)
- Battery Potential (Voltage), Switched (PID: 158);
- Battery Potential (Voltage) (PID: 168)
- Total Vehicle Distance (PID: 245)
- Trip Distance (PID: 244)
- Vehicle Identification Number (PID: 237)
- Boost Pressure (PID: 102)
- Fuel Level (PID: 96)
- Instantaneous Fuel Economy (PID: 184)
- Second Fuel Level (Right Side) (PID: 38)
- Intake Manifold Temperature (PID: 105)
- Percent Accelerator Pedal Position (PID: 91)
- Parking Brake Switch Status (PID: 70)
- Cruise Control Status (PID: 85)
- Power Takeoff Status (PID: 89)

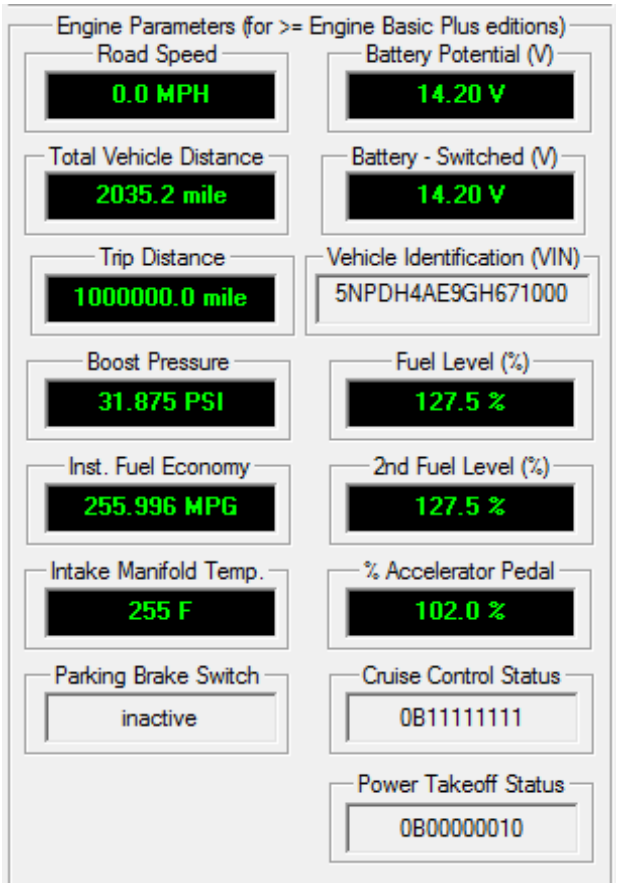


Figure 4-12

4.6 Display Panel - Engine Warnings for Engine Premium Plus and Script editions

Engine Premium Plus and Script editions of Au J1708 Simulator displays 24 engine parameters on the GUI.

- **6 Value Package parameters**
- **15 Engine Basic parameters**
- **3 Engine Warnings**
  - Water in fuel indicator (PID 97)
  - Attention / Warning Indicator Lamps (PID 44)
  - Diagnostic code & Occurrence count (PID 194)

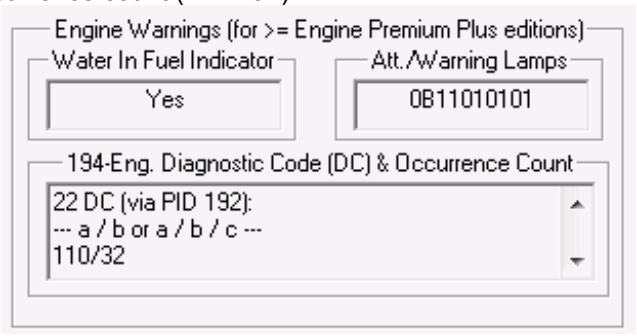


Figure 4-13

4.7 Transmission / ABS Parameters for Vehicle Platinum Plus and Script editions

Vehicle Platinum Plus and Script editions of Au J1708 Simulator displays 39 parameters (engine, transmission, and ABS) on the GUI.

- **6 value package Engine parameters**
- **15 Engine basic parameters**

- **3 Engine Warnings**
- **8 Transmission Parameters:**
  - Transmission Output Shaft Speed (PID 191)
  - Transmission Hydraulic Retarder Oil Temperature (PID 120)
  - Transmission # 1 Oil Temperature (PID 177)
  - Transmission Retarder Status (PID 47)
  - Transmission Range Selected (PID 162)
  - Transmission Range Attained (PID 163)
  - Transmission Attention / Warning Lamps (PID 44)
  - Transmission Diagnostic Code and Occurrence count (PID 194)
- **7 ABS Parameters:**
  - ABS Road Speed (PID 84)
  - ABS Battery Potential (PID 168)
  - ABS Primary Pressure (PID 117)
  - ABS Secondary Pressure (PID 118)
  - ABS Control Status (PID 49)
  - ABS Attention / Warning Lamps (PID 44)
  - ABS Diagnostic Code and Occurrence count (PID 194)

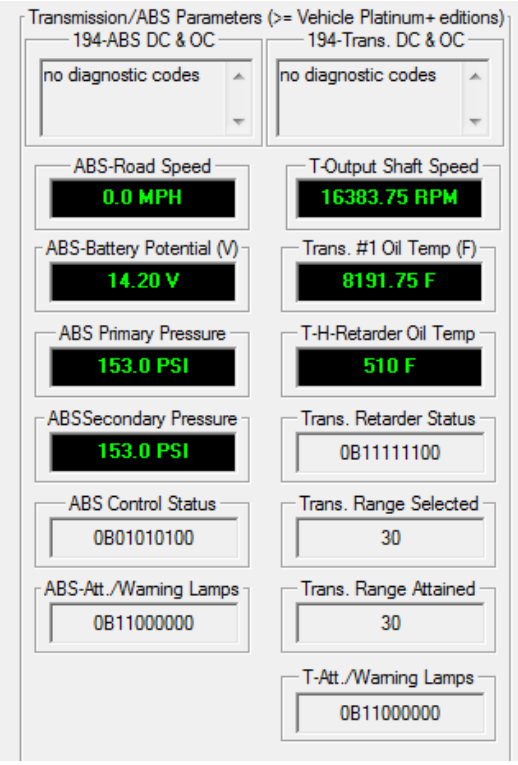


Figure 4-14

Chapter 5 Data Configuration

5.1 Value Package edition supported parameters

Value Package edition supported parameters at each control step are listed in table 5-1

Table 5-1 708 Simulation results vs. Control Step Values

Step	Engine Speed (RPM)	Engine Oil Pressure (PSI)	Engine Coolant Temperature (F)	Engine Load Percentage (%)	Instant Fuel Rate (GPH)	Engine Hour (Hr)
0	0.00	0.00	0	0.0	0.00	0.0
1	100.00	1.00	2	1.0	0.75	12.5
2	200.00	2.50	5	2.5	1.50	25.0
3	300.00	3.50	7	3.5	2.25	37.5
4	400.00	5.00	10	5.0	3.00	50.0
5	500.00	6.00	12	6.0	3.75	62.5
6	600.00	7.50	15	7.5	4.50	75.0
7	700.00	8.50	17	8.5	5.25	87.5
8	800.00	10.00	20	10.0	6.00	100.0
9	900.00	11.01	22	11.0	6.75	112.5
10	1000.00	12.51	25	12.5	7.50	125.0
11	1100.00	14.01	28	14.0	8.25	137.5
12	1200.00	15.01	30	15.0	9.00	150.0
13	1300.00	16.51	33	16.5	9.75	162.5
14	1400.00	17.51	35	17.5	10.50	175.0
15	1500.00	19.01	38	19.0	11.25	187.5
16	1600.00	20.01	40	20.0	12.00	200.0
17	1700.00	21.51	43	21.5	12.75	212.5
18	1800.00	22.51	45	22.5	13.50	225.0
19	1900.00	24.01	48	24.0	14.25	237.5
20	2000.00	25.51	51	25.5	15.00	250.0
21	2100.00	26.51	53	26.5	15.75	262.5
22	2200.00	28.01	56	28.0	16.50	275.0
23	2300.00	29.01	58	29.0	17.25	287.5
24	2400.00	30.52	61	30.5	18.00	300.0
25	2500.00	31.52	63	31.5	18.75	312.5
26	2600.00	33.02	66	33.0	19.50	325.0
27	2700.00	34.02	68	34.0	20.25	337.5
28	2800.00	35.52	71	35.5	21.00	350.0
29	2900.00	36.52	73	36.5	21.75	362.5
30	3000.00	38.02	76	38.0	22.50	375.0
31	3100.00	39.52	79	39.5	23.25	387.5
32	3200.00	40.52	81	40.5	24.00	400.0
33	3300.00	42.02	84	42.0	24.75	412.5
34	3400.00	43.02	86	43.0	25.50	425.0
35	3500.00	44.52	89	44.5	26.25	437.5
36	3600.00	45.52	91	45.5	27.00	450.0
37	3700.00	47.02	94	47.0	27.75	462.5
38	3800.00	48.02	96	48.0	28.50	475.0
39	3900.00	49.52	99	49.5	29.25	487.5
40	4000.00	51.03	102	51.0	30.00	500.0
41	4100.00	52.03	104	52.0	30.75	512.5
42	4200.00	53.53	107	53.5	31.50	525.0
43	4300.00	54.53	109	54.5	32.25	537.5
44	4400.00	56.03	112	56.0	33.00	550.0
45	4500.00	57.03	114	57.0	33.75	562.5
46	4600.00	58.53	117	58.5	34.50	575.0
47	4700.00	59.53	119	59.5	35.25	587.5

Step	Engine Speed (RPM)	Engine Oil Pressure (PSI)	Engine Coolant Temp (F)	Engine Load Percentage (%)	Instant Fuel Rate (GPH)	Engine Hour (Hr)
48	4800.00	61.03	122	61.0	36.00	600.0
49	4900.00	62.03	124	62.0	36.75	612.5
50	5000.00	63.53	127	63.5	37.50	625.0
51	5100.00	65.03	130	65.0	38.25	637.5
52	5200.00	66.03	132	66.0	39.00	650.0
53	5300.00	67.53	135	67.5	39.75	662.5
54	5400.00	68.53	137	68.5	40.50	675.0
55	5500.00	70.04	140	70.0	41.25	687.5
56	5600.00	71.04	142	71.0	42.00	700.0
57	5700.00	72.54	145	72.5	42.75	712.5
58	5800.00	73.54	147	73.5	43.50	725.0
59	5900.00	75.04	150	75.0	44.25	737.5
60	6000.00	76.54	153	76.5	45.00	750.0
61	6100.00	77.54	155	77.5	45.75	762.5
62	6200.00	79.04	158	79.0	46.50	775.0
63	6300.00	80.04	160	80.0	47.25	787.5
64	6400.00	81.54	163	81.5	48.00	800.0
65	6500.00	82.54	165	82.5	48.75	812.5
66	6600.00	84.04	168	84.0	49.50	825.0
67	6700.00	85.04	170	85.0	50.25	837.5
68	6800.00	86.54	173	86.5	51.00	850.0
69	6900.00	87.54	175	87.5	51.75	862.5
70	7000.00	89.04	178	89.0	52.50	875.0
71	7100.00	90.55	181	90.5	53.25	887.5
72	7200.00	91.55	183	91.5	54.00	900.0
73	7300.00	93.05	186	93.0	54.75	912.5
74	7400.00	94.05	188	94.0	55.50	925.0
75	7500.00	95.55	191	95.5	56.25	937.5
76	7600.00	96.55	193	96.5	57.00	950.0
77	7700.00	98.05	196	98.0	57.75	962.5
78	7800.00	99.05	198	99.0	58.50	975.0
79	7900.00	100.55	201	100.5	59.25	987.5
80	8000.00	102.05	204	102.0	60.00	1000.0
81	8419.00	103.05	206	103.0	108.19	50950.0
82	8838.25	104.55	209	104.5	156.39	100899.9
83	9257.50	105.55	211	105.5	204.59	150849.9
84	9676.75	107.05	214	107.0	252.80	200799.8
85	10095.75	108.05	216	108.0	300.98	250749.8
86	10515.00	109.55	219	109.5	349.19	300699.7
87	10934.25	110.56	221	110.5	397.39	350649.7
88	11353.50	112.06	224	112.0	445.59	400599.6
89	11772.50	113.06	226	113.0	493.78	450549.6
90	12191.75	114.56	229	114.5	541.98	500499.5
91	12611.00	116.06	232	116.0	590.19	550449.5
92	13030.25	117.06	234	117.0	638.39	600399.4
93	13449.25	118.56	237	118.5	686.58	650349.4
94	13868.50	119.56	239	119.5	734.78	700299.3
95	14287.75	121.06	242	121.0	782.98	750249.3
96	14707.00	122.06	244	122.0	831.19	800199.2
97	15126.00	123.56	247	123.5	879.38	850149.2
98	15545.25	124.56	249	124.5	927.58	900099.1
99	15964.50	126.06	252	126.0	975.78	950049.1
100	16383.75	127.56	255	127.5	1023.98	999999.0

5.2 Engine Basic edition supported parameters

Cruise control status vs. control step is summarized in table 5 - 2.

Table 5 - 2 Cruise control status (PID 85) vs. control step

Step	Cruise control status (PID 85) Value	Bit 8: cruise mode	Bit 7: clutch switch	Bit 6: brake switch	Bit 5: accelerate switch	Bit 4: resume switch	Bit 3: coast switch	Bit 2: set switch	Bit 1: cruise control switch	Cruise Control Status (PID: 85)
0 - 39	00000000	0	0	0	0	0	0	0	0	Cruise mode is not ACTIVE, all switches are OFF
40	00000001	0	0	0	0	0	0	0	1	Cruise control switch is ON
41	00000011	0	0	0	0	0	0	1	1	Cruise control switch is ON; set switch is ON
42	00000101	0	0	0	0	0	1	0	1	Cruise control switch is ON; coast switch is ON
43	00001001	0	0	0	0	1	0	0	1	Cruise control switch is ON; resume switch is ON
44	00010001	0	0	0	1	0	0	0	1	Cruise control switch is ON; accelerate switch is ON
45	00100001	0	0	1	0	0	0	0	1	Cruise control switch is ON; brake switch is ON
46	01000001	0	1	0	0	0	0	0	1	Cruise control switch is ON; clutch switch is ON
47-99	10000001	1	0	0	0	0	0	0	1	Cruise control switch is ON; cruise mode is active
100	11111111	1	1	1	1	1	1	1	1	Cruise mode is ACTIVE, all switches are ON

Power takeoff status vs. control step is summarized in table 5 - 3.

Table 5 - 3 Power takeoff status (PID 89) vs. Control Step

Step	Power takeoff status (PID 89) value	Bit 8 - PTO Mode	Bit - clutch switch	Bit 6 - brake switch	Bit 5 - accelerate switch	Bit 4 - resume switch	Bit 3 - coast switch	Bit 2 - set switch	Bit 1 - PTO control switch	Power takeoff status (PID: 89)
0 - 9	0B00000000	0	0	0	0	0	0	0	0	All bits are off/inactive
10	0B00000001	0	0	0	0	0	0	0	1	PTO control switch is ON
11 - 20	0B10000001	1	0	0	0	0	0	0	1	PTO is active, PTO control switch is ON
21 - 39	0B00000000	0	0	0	0	0	0	0	0	All bits are off/inactive
40	0B00000010	0	0	0	0	0	0	1	0	Set switch is ON
41	0B00000110	0	0	0	0	0	1	1	0	Set switch and Coast switch is ON
42	0B00001010	0	0	0	0	1	0	1	0	Set switch and Resume switch is ON
43	0B00010010	0	0	0	1	0	0	1	0	Set switch and Accelerate switch is ON
44	0B00100010	0	0	1	0	0	0	1	0	Set switch and Brake switch is ON
45	0B01000010	0	1	0	0	0	0	1	0	Set switch and Clutch switch is ON
46 - 100	0B00000010	0	0	0	0	0	0	1	0	Set switch is ON

Parking brake switch status vs. control step is summarized in table 5 - 4.

Table 5 - 4 Parking brake switch status (PID 70) vs. Control Step Values

Control Step	Parking brake switch status (PID: 70)
0 - 8	active
9 – 100	Inactive

The rest of the 11 simulated parameters at each control step are listed in table 5 - 5.

Table 5 - 5 Engine Basic Edition J1708 Simulation results vs. Control Step Values

PID	84	184	158	168	105	91	102	96	38	244	245
Step	Road Speed (MPH)	Inst. Fuel Economy (MPG)	Battery-switched (V)	Battery Potential (V)	Intake Manifold Temp. (F)	% Accelerator Pedal	Boost Pressure (PSI)	Fuel Level (%)	2nd Fuel Level (%)	Trip Distance (Mile)	Total Vehicle Distance (Mile)
0	0.0	0.000	0.0	0.0	0	0.00%	0.000	0.00%	0.00%	0.0	0.0
1	1.0	2.559	0.4	0.5	2	0.80%	0.250	1.00%	0.50%	11.5	12.5
2	2.5	5.117	0.8	0.9	5	2.00%	0.625	2.50%	2.00%	24.0	25.0
3	3.5	7.680	1.2	1.3	7	2.80%	0.875	3.50%	3.00%	36.5	37.5
4	5.0	10.238	1.6	1.7	10	4.00%	1.250	5.00%	4.50%	49.0	50.0
5	6.0	12.797	2.0	2.1	12	4.80%	1.500	6.00%	5.50%	61.5	62.5
6	7.5	15.359	2.4	2.5	15	6.00%	1.875	7.50%	7.00%	74.0	75.0
7	8.5	17.918	2.8	2.9	17	6.80%	2.125	8.50%	8.00%	86.5	87.5
8	10.0	20.477	3.2	3.3	20	8.00%	2.500	10.00%	9.50%	99.0	100.0
9	11.0	23.039	3.6	3.7	22	8.80%	2.750	11.00%	10.50%	1.1	112.5
10	12.5	25.598	4.0	4.1	25	10.00%	3.125	12.50%	12.00%	124.0	125.0
11	14.0	28.156	4.4	4.5	28	11.20%	3.500	14.00%	13.50%	136.5	137.5
12	15.0	30.719	4.8	4.9	30	12.00%	3.750	15.00%	14.50%	149.0	150.0
13	16.5	33.277	5.2	5.3	33	13.20%	4.125	16.50%	16.00%	161.5	162.5
14	17.5	35.836	5.6	5.7	35	14.00%	4.375	17.50%	17.00%	174.0	175.0
15	19.8	38.398	6.0	6.1	38	15.20%	4.750	19.00%	18.50%	186.5	187.5
16	20.0	40.957	6.4	6.5	40	16.00%	5.000	20.00%	19.50%	199.0	200.0
17	21.5	43.516	6.8	6.9	43	17.20%	5.375	21.50%	21.00%	211.5	212.5
18	22.5	46.078	7.2	7.3	45	18.00%	5.625	22.50%	22.00%	224.0	225.0
19	24.0	48.637	7.6	7.7	48	19.20%	6.000	24.00%	23.50%	236.5	237.5
20	25.5	51.199	8.0	8.1	51	20.40%	6.375	25.50%	25.00%	249.0	250.0
21	26.5	53.758	8.4	8.5	53	21.20%	6.625	26.50%	26.00%	261.5	262.5
22	28.0	56.316	8.8	8.9	56	22.40%	7.000	28.00%	27.50%	274.5	275.0
23	29.0	58.879	9.2	9.3	58	23.20%	7.250	29.00%	28.50%	286.5	287.5
24	30.5	61.438	9.6	9.7	61	24.40%	7.625	30.50%	30.00%	299.0	300.0
25	31.5	63.996	10.0	10.1	63	25.20%	7.875	31.50%	31.00%	311.5	312.5
26	33.0	66.559	10.4	10.5	66	26.40%	8.250	33.00%	32.50%	324.0	325.0
27	34.0	69.117	10.8	10.9	68	27.20%	8.500	34.00%	33.50%	336.5	337.5
28	35.5	71.676	11.2	11.3	71	28.40%	8.875	35.50%	35.00%	349.0	350.0
29	36.5	74.238	11.6	11.7	73	29.20%	9.125	36.50%	36.00%	361.5	362.5
30	38.0	76.797	12.0	12.1	76	30.40%	9.500	38.00%	37.50%	374.0	375.0
31	39.5	79.355	12.4	12.5	79	31.60%	9.875	39.50%	39.00%	386.5	387.5
32	40.5	81.918	12.8	12.9	81	32.40%	10.125	40.50%	40.00%	399.0	400.0
33	42.0	84.477	13.2	13.3	84	33.60%	10.500	42.00%	41.50%	411.5	412.5
34	43.0	87.035	13.6	13.7	86	34.40%	10.750	43.00%	42.50%	424.0	425.0
35	44.5	89.598	14.0	14.1	89	35.60%	11.125	44.50%	44.00%	436.5	437.5

PID	84	184	158	168	105	91	102	96	38	244	245
Step	Road Speed (MPH)	Inst. Fuel Economy (MPG)	Battery-switched (V)	Battery Potential (V)	Intake Manifold Temp. (F)	% Accelerator Pedal	Boost Pressure (PSI)	Fuel Level (%)	2nd Fuel Level (%)	Trip Distance (Mile)	Total Vehicle Distance (Mile)
36	45.5	92.156	14.4	14.5	91	36.40%	11.375	45.50%	45.00%	449.0	450.0
37	47.0	94.715	14.8	14.9	94	37.60%	11.750	47.00%	46.50%	461.5	462.5
38	48.0	92.277	15.2	15.3	96	38.40%	12.000	48.00%	47.50%	474.0	475.0
39	49.5	99.836	15.6	15.7	99	39.60%	12.375	49.50%	49.00%	486.5	487.5
40	51.0	102.398	16.0	16.1	102	40.00%	12.750	51.00%	50.50%	499.0	500.0
41	52.0	104.957	16.4	16.5	104	41.60%	13.000	52.00%	51.50%	511.5	512.5
42	53.5	107.516	16.8	16.9	107	42.80%	13.375	53.50%	53.00%	524.0	525.0
43	54.0	110.078	17.2	17.3	109	43.60%	13.625	54.50%	54.00%	536.5	537.6
44	56.0	112.637	17.6	17.7	112	44.80%	14.000	56.00%	55.50%	549.0	550.0
45	57.0	115.195	18.0	18.1	114	45.60%	14.250	57.00%	56.50%	561.5	562.5
46	58.5	117.758	18.4	18.5	117	46.80%	14.625	58.50%	58.00%	574.0	575.0
47	59.5	120.316	18.8	18.9	119	47.60%	14.875	59.50%	59.00%	586.5	587.5
48	61.0	122.875	19.2	19.3	122	48.80%	15.250	61.00%	60.50%	599.0	600.0
49	62.0	125.438	19.6	19.7	124	49.60%	15.500	62.00%	61.50%	611.5	612.5
50	63.5	127.996	20.0	20.1	127	50.80%	12.875	63.50%	63.00%	624.0	625.0
51	65.0	130.555	20.4	20.5	130	52.00%	16.250	65.00%	64.50%	636.5	637.5
52	66.0	133.117	20.8	20.9	132	52.80%	16.500	66.00%	65.50%	649.0	650.0
53	67.5	135.676	21.2	21.3	135	54.00%	16.875	67.50%	67.00%	661.5	662.5
54	68.5	138.234	21.6	21.7	137	54.00%	17.125	68.50%	68.00%	674.0	675.0
55	70.0	140.797	22.0	22.1	140	56.00%	17.500	70.00%	69.50%	686.5	687.5
56	71.0	143.355	22.4	22.5	142	56.80%	17.750	71.00%	70.50%	699.0	700.0
57	72.5	145.914	22.0	22.9	145	58.00%	18.125	72.50%	72.00%	711.5	712.5
58	73.5	148.477	23.2	23.3	147	58.80%	18.375	73.50%	73.00%	724.0	725.0
59	75.0	151.035	23.6	23.7	150	60.00%	18.750	75.00%	74.50%	736.5	737.5
60	76.5	153.598	24.0	24.1	153	61.20%	19.125	76.50%	76.00%	749.0	750.0
61	77.5	156.156	24.0	24.5	155	62.00%	19.375	77.50%	77.00%	761.5	762.5
62	79.0	158.715	24.8	24.9	158	63.20%	19.750	79.00%	78.50%	774.0	745.0
63	80.0	161.277	25.2	25.3	160	64.00%	20.000	80.00%	79.50%	786.5	787.5
64	81.5	163.836	25.6	25.7	163	35.20%	20.375	81.50%	81.00%	799.0	800.0
65	82.5	166.395	26.0	26.1	165	66.00%	20.625	82.50%	82.00%	811.5	812.5
66	84.0	168.957	26.4	26.5	168	67.20%	21.000	84.00%	83.50%	824.0	825.0
67	85.0	171.516	26.8	26.9	170	68.00%	21.250	85.00%	84.50%	836.5	837.5
68	86.5	174.074	27.2	27.3	173	69.20%	21.625	86.50%	86.00%	849.0	850.0
69	87.5	176.637	27.6	27.7	175	70.00%	21.875	87.50%	87.00%	861.5	862.5
70	89.0	179.195	28.0	28.1	178	72.10%	22.250	89.00%	88.50%	874.0	875.0
71	90.5	181.754	28.4	28.5	181	72.40%	22.625	90.50%	90.00%	886.5	887.5
72	91.5	18.316	28.8	28.9	183	73.20%	22.875	91.50%	91.00%	899.0	900.0
73	93.0	186.875	29.2	29.3	186	74.40%	23.250	93.00%	92.50%	911.5	912.5
74	94.0	189.434	29.6	29.7	188	75.20%	23.500	94.00%	93.50%	924.0	925.0
75	95.5	191.996	30.0	30.1	191	76.40%	23.875	95.50%	95.00%	936.5	937.5
76	96.5	194.555	30.4	30.5	193	77.20%	24.125	96.50%	96.00%	949.0	950.0
77	98.0	197.113	30.8	30.9	196	78.40%	24.500	98.00%	97.50%	961.5	962.5
78	99.0	199.676	31.2	31.3	198	79.20%	24.750	99.00%	98.50%	974.0	975.0

PID	84	184	158	168	105	91	102	96	38	244	245
Step	Road Speed (MPH)	Inst. Fuel Economy (MPG)	Battery-switched (V)	Battery Potential (V)	Intake Manifold Temp. (F)	% Accelerator Pedal	Boost Pressure (PSI)	Fuel Level (%)	2nd Fuel Level (%)	Trip Distance (Mile)	Total Vehicle Distance (Mile)
79	100.5	202.234	31.6	31.7	201	80.40%	25.125	100.50%	100.00%	986.5	987.5
80	102.0	204.797	32.0	32.1	204	81.60%	25.500	102.00%	101.50%	999.0	1000.0
81	103.0	207.355	194.2	194.3	206	82.40%	25.750	103.00%	102.50%	50949.0	50950.0
82	104.5	209.914	356.5	356.6	209	83.60%	26.125	104.50%	104.00%	100899.0	100900.0
83	105.0	212.477	518.7	518.8	211	84.40%	26.375	105.50%	105.00%	150849.0	150850.0
84	107.0	215.035	681.0	681.1	214	85.60%	26.750	107.00%	106.50%	200799.0	200780.0
85	108.0	217.594	843.2	843.3	216	86.40%	27.000	108.00%	107.50%	250749.0	250750.0
86	109.5	220.156	1005.4	1005.5	219	87.60%	27.375	109.50%	109.00%	300699.0	300670.0
87	110.5	222.715	1167.7	1167.8	221	88.40%	27.625	110.50%	110.00%	350649.0	350650.0
88	112.0	225.273	1323.9	1330.0	224	89.60%	28.000	112.00%	111.50%	400599.0	400600.0
89	113.0	227.836	1492.1	1492.2	226	90.40%	28.250	113.00%	112.50%	450649.0	450550.0
90	114.5	230.395	1654.4	1654.5	229	91.60%	28.625	114.50%	114.00%	500499.0	500500.0
91	116.0	232.935	1816.6	1816.7	232	92.80%	29.000	116.00%	115.50%	550449.0	550450.0
92	117.0	235.516	1978.9	1979.0	234	93.60%	29.250	117.00%	116.50%	600399.0	600400.0
93	118.5	238.074	2141.1	2141.2	237	94.80%	29.625	118.50%	118.00%	650349.0	650350.0
94	119.5	240.633	2303.3	2303.4	239	95.60%	29.875	119.50%	119.00%	700299.0	700300.0
95	121.0	243.195	2465.6	2465.7	242	96.80%	30.250	121.00%	120.50%	750249.0	750250.0
96	122.0	245.754	2627.8	2627.9	244	97.60%	30.500	122.00%	121.50%	800199.0	800200.0
97	123.5	248.313	2790.0	2790.1	247	98.80%	30.875	123.50%	123.00%	850149.0	850150.0
98	124.5	250.875	2952.3	2952.4	249	99.60%	31.125	124.50%	124.00%	900099.0	900100.0
99	126.0	253.434	3114.5	3114.6	252	100.80%	31.500	126.00%	125.50%	950049.0	950050.0
100	127.5	255.996	3276.8	3276.8	255	102.00%	31.875	127.50%	127.50%	1000000.0	1000000.0

5.3 Water in fuel indicator (PID 97)

If Warning is OFF (Warning is un-check, Warning LED is OFF), Water in fuel indicator shows "No" from 0 - 100%.
If Warning is ON (Warning is checked, Warning LED is ON), Water in fuel indicator status will be "No" between step 0 - 39%, the status will change to "Yes" when step value is between 40 - 100%. It is summarized in table 5 - 6.

Table 5 - 6 Water in fuel indicator vs. Step value

	Step	Binary (bit 8)	Water in fuel indicator (PID: 97)
Warning is enabled	0 - 39	01111111	No
	40 - 100	11111111	Yes
Warning is disabled	0 - 100	01111111	No

5.4 Engine Attention / Warning Indicator Lamps (PID 44)

When Warning is OFF, all three Engine Attention / Warning Indicator Lamps (Protect, Amber, Red) are OFF, as shown in table 5 -7.

Table 5 - 7 Attention / Warning Indicator Lamps Status when warning is disabled

Step	Value	Bit 8 -7		Bit 6 -5		Bit 4 -3		Bit 2 - 1		Attention / Warning Indicator Lamps Status (PID: 44) - Warning is OFF
		Reserved		Protect lamp		Amber lamp		Red lamp		
0-100	11000000	1	1	0	0	0	0	0	0	Protect, Amber, Red lamps are OFF

When Warning is ON, Engine Attention / Warning Indicator Lamps Status vs. control step is summarized in table 5 - 8.

Table 5 - 8 Attention / Warning Indicator Lamps Status vs. control step when warning is enabled

Control Step	Display Value	Bit 8 - 7		Bit 6 - 5		Bit 4 - 3		Bit 2 - 1		Engine Attention / Warning Indicator Lamps Status (PID: 44)- when Warning is ON
		Reserved		Protect lamp		Amber lamp		Red lamp		
0	11010101	1	1	0	1	0	1	0	1	Protect, Amber, Red lamp are ON
1	11110000	1	1	1	1	0	0	0	0	Protect lamp not available, Amber, Red lamp are OFF
2	11100000	1	1	1	0	0	0	0	0	Protect lamp has error, Amber lamp, Red lamp are OFF
3	11010000	1	1	0	1	0	0	0	0	Protect lamp is ON, Amber lamp, Red lamp are OFF
4	11001100	1	1	0	0	1	1	0	0	Amber lamp not available, Protect, Red lamp are OFF
5	11001000	1	1	0	0	1	0	0	0	Amber lamp has error, Protect and Red lamp are OFF
6	11000100	1	1	0	0	0	1	0	0	Amber lamp is ON, Protect and Red lamp are OFF
7	11000011	1	1	0	0	0	0	1	1	Red lamp not available, Amber, Protect lamp are OFF
8	11000010	1	1	0	0	0	0	1	0	Red lamp has error, Amber lamp, Protect lamp are OFF
9	11000001	1	1	0	0	0	0	0	1	Red lamp is ON, Amber lamp, Protect lamp are OFF
10	11010100	1	1	0	1	0	1	0	0	Protect, Amber lamp are ON, Red lamp is OFF
11	11010001	1	1	0	1	0	0	0	1	Protect, Red lamp are ON, Amber lamp is OFF
12	11000101	1	1	0	0	0	1	0	1	Protect lamp is OFF, Amber and Red lamp are ON
13 - 100	11010101	1	1	0	1	0	1	0	1	Protect, Amber, Red lamp are ON

5.5 *Engine Diagnostic Code (DC) and Occurrence count (OC) (PID 194)*

- There are up to 22 Engine diagnostic code (PID 194) can be simulated in Au J1708/J1587 Simulator.
- When Warning is OFF, PID194 will be transmitted once per second with zero warning code.
- When Warning is ON , diagnostic code (DC) will be available and controlled by the following control steps:
  - From Step 0 - 9%, there is one Engine diagnostic code in the format of "a / b" simulated in each step.
  - From Step 10 - 21%, there is one Engine diagnostic code in the format of "a / b / c " simulated in each step.
  - From Step 22 - 40%, there are 8 diagnostic codes in the format of "a / b " simulated in each step.
  - From Step 41 - 60%, there are 5 diagnostic codes in the format of "a / b / c " simulated in each step.
  - From Step 61 - 100%, all 22 diagnostic codes in the format of "a / b " or "a / b / c " will be sent via PID 192.

Table 5 - 9 Engine Diagnostic code and occurrence count vs. Control Step (Warning is ON)

Step	a	b
0	110	32
1	100	33
2	84	34
3	96	35
4	84	36
5	132	37
6	91	38
7	40	39
8	21	114
9	27	55

Step	a	b	c
10	108	168	1
11	190	233	2
12	102	170	3
13	174	171	4
14	97	172	5
15	190	173	6
16	105	174	7
17	70	175	8
18	85	180	9
19	33	244	10
20	168	161	127
21	106	194	20

Step 22 - 40%, 8 DC in format a/b simulated

a	b
84	34
96	35
84	36
132	37
91	38
40	39
21	114
27	55

Step 41-60%, 5 DC in the format of a/b/c simulated

a	b	c
70	175	8
85	180	9
33	244	10
168	161	127
106	194	20

From 61 - 100%, 22 diagnostic codes are send via PID 192, in the format a/b and/or a/b/c

* a -- SID or PID of a standard diagnostic code
* b -- Diagnostic code character
* c -- Occurrence count for the diagnostic code defined by the preceding 2 characters.

Note: When PID 194's sentences are longer than 21 bytes, PID 192 (Multi-section parameters) will be used.

Table 5 - 10 10 Engine Diagnostic codes with occurrence count not include

a	b	Engine Diagnostic Code- Occurrence count not included
110	32	**--- Engine Coolant Temperature above normal operational range** Current Status of fault is active, standard DC
100	33	**--- Engine oil pressure below normal operational range**, Current Status of fault is active, standard DC,
84	34	**--- Road Speed erratic, intermittent, or incorrect..** Current Status of fault is active, standard DC
96	35	**--- Fuel level sensor voltage above normal or shorted high** Current Status of fault is active, standard DC
84	36	**--- Road Speed sensor voltage below normal or shorted low** Current Status of fault is active, standard DC,
132	37	**--- Mass Air Flow sensor current below normal or open circuit** Current Status of fault is active, standard DC
91	38	**--- Percent Accelerator Pedal Position sensor current is above normal or grounded circuit** Current Status of fault is active, standard DC,
40	39	**--- Engine Retarder Switches not responding properly.** Current Status of fault is active, standard DC.
21	114	**--- Engine Position Sensor erratic, intermittent, or incorrect** Current Status of fault is inactive, standard DC,
27	55	**--- Variable Geometry Turbocharger Actuator #1 not responding properly.** Current Status of fault is active, standard DC,

Table 5 - 11 12 Engine Diagnostic code with occurrence count include

a	b	c	Engine Diagnostic Code - Occurrence count included
108	168	1	**--- Barometric Pressure is abnormal**. DC occurred once, Current Status of fault is active, standard DC
190	233	2	**--- Engine Speed has abnormal update rate** DC occurred 2 times, Current Status of fault is inactive, standard DC
102	170	3	**--- Boost Pressure has abnormal rate of change** DC occurred 3 times, Current Status of fault is active, standard DC,
174	171	4	**--- Failure mode not identifiable**. DC occurred 4 times, Current Status of fault is active, standard DC,
97	172	5	**--- Bad intelligent or component (in Water in Fuel Indicator)** DC occurred 5 times , Current Status of fault is active, standard DC,
190	173	6	**--- Engine Speed sensor Out of Calibration** DC occurred 6 times , Current Status of fault is active, standard DC,
105	174	7	**--- Intake Manifold Temperature has special instruction** DC occurred 7 times, Current Status of fault is active, standard DC.
70	175	8	**--- Parking Brake Switch Status Reserved for assignment by the SAE Subcommittee** DC occurred 8 times, Current Status of fault is active, standard DC,
85	180	9	**--- Engine Oil Burn Valve sensor Voltage below normal or shorted low** DC occurred 9 times, Current Status of fault is active, standard diagnostic code
33	244	10	**--- Fan Clutch Output Device Driver sensor Voltage below normal or shorted low** DC occurred 10 times, Current Status of fault is inactive, standard DC.
168	161	127	**--- Battery Potential (Voltage) is valid but below normal operational range** DC occurred 127 times, Current Status of fault is active, standard DC.
106	194	20	**--- Percent Exhaust Gas Recirculation Valve #2 Position Data erratic, intermittent, or incorrect** DC occurred 20 times, Current Status of fault is inactive, expansion DC, PID =106 + 256 = 362

5.6 ABS and Transmission Attention / Warning Lamps (PID 44)

When Warning is **OFF**, all three Attention / Warning Indicator Lamps for Transmission and ABS (Protect, Amber, Red) are OFF, as shown in table 5 - 12.

Table 5 - 12 Attention / Warning Indicator Lamps Status when Warning is OFF

Warning is OFF		Reserved		Protect lamp		Amber lamp		Red lamp		Attention / Warning Indicator Lamps Status
Step	GUI	8	7	6	5	4	3	2	1	
0 - 100%	11000000	1	1	0	0	0	0	0	0	Protect, Amber, Red lamps are OFF

When Warning is **ON**, Transmission Attention / Warning Indicator Lamps Status vs. control step is summarized in table 5 - 13.

Table 5 - 13 Transmission Attention / Warning Indicator Lamps Status vs. control step (Warning is ON)

Warning is ON		Transmission Attention / Warning Indicator Lamps Status
Step	**Display values on GUI**	
0%	11010101	Protect, Amber, Red lamp are ON
1%	11001100	Amber lamp not available, Protect, Red lamp are OFF
2%	11001000	Amber lamp has error, Protect and Red lamp are OFF
3%	11000100	Amber lamp is ON, Protect and Red lamp are OFF
4%	11000011	Red lamp not available, Amber, Protect lamp are OFF
5%	11000010	Red lamp has error, Amber, Protect lamp are OFF
6%	11000001	Red lamp is ON, Amber, Protect lamp are OFF
7%	11010100	Protect, Amber lamp are ON, Red lamp is OFF
8%	11010001	Protect, Red lamp are ON, Amber lamp is OFF
9%	11000101	Amber, Red lamp are ON, Protect lamp is OFF,
10%	11110000	Protect lamp not available, Amber, Red lamp are OFF
11%	11100000	Protect lamp has error, Amber, Red lamp are OFF
12%	11010000	Protect lamp is ON, Amber, Red lamp are OFF
13 - 100%	11010101	Protect, Amber, Red lamp are ON

When warning is **ON**, ABS Attention/Warning Indicator Lamps Status vs. control step is summarized in table 5 - 14.

Table 5 - 14 ABS Attention / Warning Indicator Lamps Status vs. control step (Warning is ON)

Warning is ON		ABS Attention / Warning Indicator Lamps Status
Step	**Display values on GUI**	
0%	11010101	Protect, Amber, Red lamp are ON
1%	11000011	Red lamp not available, Amber, Protect lamp are OFF
2%	11000010	Red lamp has error, Amber, Protect lamp are OFF
3%	11000001	Red lamp is ON, Amber, Protect lamp are OFF
4%	11010100	Protect, Amber lamp are ON, Red lamp is OFF
5%	11010001	Protect, Red lamp are ON, Amber lamp is OFF
6%	11000101	Amber, Red lamp are ON, Protect lamp is OFF,
7%	11110000	Protect lamp not available, Amber, Red lamp are OFF
8%	11100000	Protect lamp has error, Amber, Red lamp are OFF
9%	11010000	Protect lamp is ON, Amber, Red lamp are OFF
10%	11001100	Amber lamp not available, Protect, Red lamp are OFF
11%	11001000	Amber lamp has error, Protect and Red lamp are OFF
12%	11000100	Amber lamp is ON, Protect and Red lamp are OFF
13 - 100 %	11010101	Protect, Amber, Red lamp are ON

5.7 ABS Control Status (PID 49)

- At step 0 - 1%, and 13 - 99%, no matter Warning is ON or OFF, the ABS control status bit 8 - 3 is always set to 000000, which means ABS off-road function switch is Off, ABS retarder control and brake control are Not Active.
- At step 100%, no matter Warning is ON or OFF, the ABS control status bit 8 - 3 is always set to 010101, which means ABS off-road function switch is ON, ABS retarder control and brake control are Active.
  - At step 0 - 1%, and 13 - 100%, ABS control status bit 2 - 1 will change as Warning is turned ON or OFF.
  - When Warning is ON, ABS control status bit 2 - 1 is set to 01, which means ABS warning lamp is ON;
  - when Warning is OFF, ABS control status bit 2 - 1 is set to 00, which means ABS warning lamp is OFF.
  - ABS control status at step 2 - 12 %, the value is not affected whether Warning is ON or OFF.

Table 5 - 15 ABS control status at Step 0%, 1%, and from 13% to 100%

Step	Warning ON	Warning OFF	ABS Control Status (PID = 49) (0x31)
0 - 1, 13 - 99	00000001	00000000	ABS off-road function switch is Off, retarder control, brake control are Not active When Warning is enabled, ABS warning Lamp will be ON; When Warning is disabled, ABS warning Lamp will be OFF
2	00000010		ABS warning lamp has an Error
3	00000011		ABS warning lamp is Not Available
4	00000100		ABS brake control is Active
5	00001000		ABS brake control has an Error
6	00001100		ABS brake control is Not Available
7	00010000		ABS retarder control is Active
8	00100000		ABS retarder control has an Error
9	00110000		ABS retarder control is Not Available
10	01000000		ABS off-road function switch is ON
11	10000000		ABS off-road function switch has an Error
12	11000000		ABS off-road function switch is Not Available
100	01010101	01010100	ABS off-road function switch is On, retarder control and brake control are Active When Warning is enabled, ABS warning Lamp will be ON; When Warning is disabled, ABS warning Lamp will be OFF

5.8 Transmission Retarder Status (PID 47)

Transmission retarder status vs. control step in Au J1708 Simulator is listed in Table 5 - 16.

Table 5 - 16 Transmission retarder status vs. control steps

Step	GUI Display	Transmission Retarder Status (PID 47)
0	11111100	Retarder is Off
1	11111111	Retarder is not available
2	11111110	Retarder has an error
3	11111101	Retarder is On
4 - 100	11111100	Retarder is Off

5.9 Transmission Diagnostic Code (DC) and Occurrence count (OC) (PID 194)

- There are up to 22 Transmission diagnostic codes (PID 194) that can be simulated in Au J1708/J1587 Simulator.
- When warning is OFF, PID 194 will be transmitted once per second with zero warning code.
- When warning is ON, diagnostic codes (DC) will be available and controlled by the following control steps:

Table 5 - 17 Transmission DC vs. Control Step for Vehicle Platinum Edition (Warning ON)

Step	a	b
0	191	32
1	120	33
2	47	34
3	177	35
4	163	36
5	7	53
6	8	54
7	9	119
8	10	50
9	11	55

Step	a	b	c
10	69	232	1
11	64	169	2
12	124	170	3
13	127	171	4
14	12	188	5
15	13	189	6
16	14	190	7
17	15	255	8
18	16	180	9
19	18	180	10
20	55	177	128
21	63	242	255

Step 22 - 40%, 8 transmission DC a/b simulated

a	b
47	34
177	35
163	36
7	53
8	54
9	119
10	50
11	55

Step 41-60%, 5 DC in the format of a/b/c simulated

a	b	c
15	255	8
16	180	9
18	180	10
55	177	128
63	242	255

From 61 - 100%, 22 diagnostic codes are send via PID 192, in the format a/b and/or a/b/c

* a -- SID or PID of a standard diagnostic code
* b -- Diagnostic code character

* c -- Occurrence count for the diagnostic code defined by the preceding 2 characters.
- From Step 0 - 9%, there is 1 Transmission diagnostic code in the format of "a/b" simulated in each step.
- From Step 10 - 21%, there is 1 Transmission diagnostic code in the format of "a/b/c " simulated in each step.
- From Step 22 - 40%, there are 8 Transmission diagnostic codes in the format of "a/b " simulated in each step.
- From Step 41 - 60%, there are 5 Transmission diagnostic codes in the format of "a/b/c " simulated in each step.
- From Step 61 - 100%, all 22 Transmission diagnostic codes in the format of "a / b " or "a / b / c " via PID 192.

Table 5 - 18 10 Transmission Diagnostic Codes with Occurrence count not included

a	b	Transmission DC - Occurrence count NOT included
191	32	**---Transmission Output Shaft Speed above normal operational range** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID.
120	33	**---Hydraulic Retarder Oil Temperature below normal operational range** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID.
47	34	**---Retarder Status erratic, intermittent, or incorrect** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID.
177	35	**---Transmission #1 Oil Temperature above normal or shorted high** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID.
163	36	**---Transmission Range Attained is below normal or shorted low.** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID.
7	53	**--- Lockup Solenoid Valve sensor current below normal or open circuit** Occurrence count not included, Current Status of fault is active, standard dc, low character is SID.
8	54	**--- Forward Solenoid Valve sensor current above normal or grounded circuit** Occurrence count not included, Current Status of fault is active, standard dc, low character is SID.
9	119	**---Low Signal Solenoid Valve mechanical system not responding properly** Occurrence count not included, Current Status of fault is inactive, standard dc, low character is SID.
10	50	**--- Retarder Enable Solenoid Valve erratic, intermittent, or incorrect** Occurrence count not included, Current Status of fault is active, standard dc, low character is SID.
11	55	---**Retarder Modulation Solenoid Valve mechanical system not responding properly** Occurrence count not included, Current Status of fault is active, standard dc, low character is SID

Table 5 - 19 12 Transmission Diagnostic Code with Occurrence count included

a	b	c	Transmission DC - Occurrence count included
64	169	2	**--- Direction Switch Status has abnormal update rate** DC occurred 2 times; Current Status of fault is active, standard dc, low character is PID
124	170	3	**--- Transmission Oil Level Abnormal rate of change** DC occurred 3 times, Current Status of fault is active, standard dc, low character is PID
127	171	4	**---Transmission Oil Pressure sensor Failure mode not identifiable** DC occurred 4 times, Current Status of fault is active, standard dc, low character is PID
12	188	5	**---Retarder Response Solenoid Valve sensor has Bad intelligent device or component** DC occurred 5 times, Current Status of fault is active, standard dc, low character is SID
13	189	6	**---Differential Lock Solenoid Valve sensor is Out of Calibration** DC occurred 6 times, Current Status of fault is active, standard dc, low character is SID
14	190	7	**---Engine/Transmission Match has Special Instructions** DC occurred 7 times, Current Status of fault is active, standard dc, low character is SID
15	255	8	**---Retarder Modulation Request Sensor failure type is reserved for future assignment by the SAE Subcommittee** , DC occurred 8 times, Current Status of fault is inactive, standard dc, low character is SID
16	180	9	**---Neutral Start Output voltage below normal or shorted low** DC occurred 9 times, Current Status of fault is active, standard dc, low character is SID
18	180	10	**---Primary Shift Selector voltage below normal or shorted low** DC occurred 10 times, Current Status of fault is active, standard dc, low character is SID
55	177	128	**---Clutch Actuator data is valid but below normal operational range** DC occurred 128 times, Current Status of fault is active, standard dc, low character is SID
63	242	255	**---Output Shaft Speed Sensor erratic, intermittent, or incorrect** DC occurred 255 times, Current Status of fault is inactive, standard dc, low character is SID

5.10 ABS Diagnostic Code (DC) and Occurrence count (OC) (PID 194)

- There are up to 22 ABS diagnostic codes (PID 194) that can be simulated in Au J1708/J1587 Simulator.
- When warning is OFF, PID 194 will be transmitted once per second with zero warning code.
- When warning is ON, diagnostic code (DC) will be available and controlled by the following control steps:
  - From Step 0 - 9%, there is 1 ABS diagnostic code in the format of "a / b" simulated in each step.
  - From Step 10 - 21%, there is 1 ABS diagnostic code in the format of "a / b / c " simulated in each step.
  - From Step 22 - 40%, there are 8 ABS diagnostic codes in the format of "a / b " simulated in each step.
  - From Step 41 - 60%, there are 5 ABS diagnostic codes in the format of "a / b / c " simulated in each step.

Table 5 - 20 ABS DC vs. Control Step for Vehicle Platinum Edition (Warning ON)

Step	a	b
0	117	32
1	118	33
2	1	50
3	2	51
4	3	52
5	4	53
6	5	118
7	6	55
8	7	50
9	8	55

Step	a	b	c
10	8	168	1
11	65	169	2
12	12	234	3
13	134	171	4
14	13	188	5
15	22	253	6
16	23	190	7
17	25	191	8
18	31	180	9
19	54	180	10
20	103	241	126
21	104	178	254

Step 22 - 40%, 8 ABS DC in format a/b are simulated

a	b
1	50
2	51
3	52
4	53
5	118
6	55
7	50
8	55

Step 41-60%, 5 DC in the format of a/b/c simulated

a	b	c
25	191	8
31	180	9
54	180	10
103	241	126
104	178	254

From 61 - 100%, 22 ABS diagnostic codes are send via PID 192, in the format a/b and/or a/b/c

- From Step 61 - 100%, all 22 ABS diagnostic code in the format of "a/b " or "a/b/c " are send via PID 192.

Table 5 - 21 10 ABS Diagnostic Code with Occurrence count not included

a	b	ABS DC (via PID 192) - Occurrence count NOT included
117	32	**---Brake Primary Pressure is valid but above normal operational range** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID
118	33	**---Brake Secondary Pressure is valid but below normal operational range** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID
1	50	**---ABS Axle 1 Left Wheel Sensor is erratic, intermittent, or incorrect** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID
2	51	**---ABS Axle 1 Right Wheel Sensor above normal or shorted high** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID
3	52	**---ABS Axle 2 Left Wheel Sensor is below normal or shorted low.** Occurrence count not included, Current Status of fault is active, standard dc, low character is PID
4	53	**---ABS Axle 2 Right Wheel Sensor current below normal or open circuit** Occurrence count not included, Current Status of fault is active, standard dc, low character is SID.
5	118	**--- ABS Axle 3 Left Wheel Sensor current above normal or grounded circuit** Occurrence count not included, Current Status of fault is inactive, standard dc, low character is SID.
6	55	**--- ABS Axle 3 Right Wheel Sensor mechanical system not responding properly** Occurrence count not included, Current Status of fault is active, standard dc, low character is SID.
7	50	**--- ABS Axle 1 Left Pressure Modulation Valve erratic, intermittent, or incorrect** Occurrence count not included, Current Status of fault is active, standard dc, low character is SID.
8	55	**--- ABS Axle 1 Right Pressure Modulation Valve mechanical system not responding properly** Occurrence count not included, Current Status of fault is active, standard dc, low character is SID.

Table 5 - 22 12 ABS Diagnostic Code with Occurrence count included

a	b	c	ABS 22 DC (via PID 192) - Occurrence count included
8	168	1	**--- Brake System Air Pressure Low Warning Switch Status has abnormal frequency, pulse width, or period,** DC occurred once; Current Status of fault is inactive, standard DC, low character is PID.
65	169	2	**---Brake Switch Status Abnormal update rate** DC occurred 2 time, Current Status of fault is active, standard DC, low character is PID
12	234	3	**--- Brake Stroke Status Abnormal rate of change** DC occurred 3 times, Current Status of fault is active, standard DC, low character is PID
134	171	4	**--- Wheel Speed Sensor Status Failure mode not identifiable** DC occurred 4 times, Current Status of fault is active, standard DC, low character is PID
13	188	5	**---Retarder Control Relay voltage Bad intelligent device or component** DC occurred 5 times, Current Status of fault is active, standard DC, low character is SID
22	253	6	**---Speed Signal Input Out of Calibration** DC occurred 6 times, Current Status of fault is active, standard DC, low character is SID
23	190	7	**---Tractor ABS Warning Light Bulb has Special Instructions** DC occurred 7 times, Current Status of fault is active, standard DC, low character is SID
25	191	8	**--- Wheel Sensor, ABS Axle 1 Average has DC, it is reserved for future assignment by the SAE Subcommittee.** DC occurred 8 times, Current Status of fault is inactive, standard DC, low character is SID
31	180	9	**---Trailer Brake Slack Out of Adjustment Forward Axle Left Voltage below normal or shorted low.** DC occurred 9 times, Current Status of fault is active, standard DC, low character is SID
54	180	10	**--- Hydraulic Pump Motor Voltage below normal or shorted low** DC occurred 10 times, Current Status of fault is active, standard DC, low character is SID
103	241	126	**--- Reserved for future assignment by SAE valid but below normal operational range** DC occurred 128 times; Current Status of fault is inactive, standard DC, low character is SID
104	178	254	**--- Reserved for future assignment by SAE valid but below normal operational range** DC occurred 254 times; Current Status of fault is active, standard DC; low character is SID

5.11 ABS and Transmission Data Configuration

There are 4 ABS related parameters and 5 Transmission related parameters simulated in Au J1708/J1587 Simulator. Data configuration vs. control steps are listed in Table 5 - 23.

Table 5 - 23 ABS and Transmission Data Configuration vs. Control Step

	ABS related Data Configuration				Transmission related Data Configuration						
PID	84	117	118	168	191	120	177	162		163	
Step	Road Speed (MPH)	Primary Pressure (PSI)	Second. Pressure (PSI)	Battery Potential (V)	Output Shaft Speed (RPM)	H-retarder Oil Temp. (F)	Tran. #1 Oil Temp (F)	Range Selected		Range Attained	
0	0.0	0.0	0.0	0.00	0.00	0	-8128.00		P		P
1	1.5	1.2	0.6	0.55	101.00	4	-7377.00		P		P
2	3.0	3.0	2.4	0.95	201.00	10	-6561.75	R	9		P
3	4.0	4.2	3.6	1.35	301.00	14	-5746.50	R	8	R	9
4	5.5	6.0	5.4	1.75	401.00	20	-4931.25	R	7	R	8
5	6.5	7.2	6.6	2.15	501.00	24	-4116.00	R	6	R	7
6	7.5	9.0	8.4	2.55	601.00	30	-3301.00	R	5	R	6
7	9.0	10.2	9.6	2.95	701.00	34	-2485.75	R	4	R	5
8	10.0	12.0	11.4	3.35	801.00	40	-1670.50	R	3	R	4
9	11.5	13.2	12.6	3.75	901.00	44	-855.25	R	2	R	3
10	13.0	15.0	14.4	4.15	1001.00	50	-40.00	R	1	R	2
11	14.5	16.8	16.2	4.55	1101.00	56	-34.50		R	R	1
12	15.5	18.0	17.4	4.95	1201.00	60	-29.00		N		R
13	17.0	19.8	19.2	5.35	1301.00	66	-23.50	N			N
14	18.0	21.0	20.4	5.75	1401.00	70	-18.00	N	C	N	
15	19.5	22.8	22.2	6.15	1501.00	76	-12.50		D	N	C
16	20.5	24.0	23.4	6.55	1601.00	80	-7.00	D	1		D
17	22.0	25.8	25.2	6.95	1701.00	86	-1.50	D	2	D	1
18	23.0	27.0	26.4	7.35	1801.00	90	4.00		L	D	2
19	24.5	28.8	28.2	7.75	1901.00	96	9.50	L	1		L

	ABS related Data Configuration				Transmission related Data Configuration						
PID	84	117	118	168	191	120	177	162		163	
Step	Road Speed (MPH)	Primary Pressure (PSI)	Second. Pressure (PSI)	Battery Potential (V)	Output Shaft Speed (RPM)	H-retarder Oil Temp. (F)	Tran. #1 Oil Temp (F)	Range Selected		Range Attained	
20	26.0	30.6	30.0	8.15	2001.00	102	15.00	L	2	L	1
21	27.0	31.8	31.2	8.55	2101.00	106	20.50		1	L	2
22	28.5	33.6	33.0	8.95	2201.00	112	26.00		2		1
23	29.5	34.8	34.2	9.35	2301.00	116	31.50		3		2
24	31.0	36.6	36.0	9.75	2401.00	122	37.00		4		3
25	31.5	37.8	37.2	10.15	2501.00	126	42.50		5		4
26	33.5	39.6	39.0	10.55	2601.00	132	48.00		6		5
27	34.5	40.8	40.2	10.95	2701.00	136	53.50		7		6
28	36.0	42.6	42.0	11.35	2801.00	142	59.00		8		7
29	37.0	43.8	43.2	11.75	2901.00	146	64.50		9		8
30	38.5	45.6	45.0	12.15	3001.00	152	70.00	1	0		9
31	39.5	47.4	46.8	12.55	3101.00	158	75.50	1	1	1	0
32	41.0	48.6	48.0	12.95	3201.00	162	81.00	1	2	1	1
33	42.5	50.4	49.8	13.35	3301.00	168	86.50	1	3	1	2
34	43.5	51.6	51.0	13.75	3401.00	172	92.00	1	4	1	3
35	45.0	53.4	52.8	14.15	3501.00	178	97.50	1	5	1	4
36	46.0	54.6	54.0	14.55	3601.00	182	103.00	1	6	1	5
37	47.5	56.4	55.8	14.95	3701.00	188	108.50	1	7	1	6
38	48.5	57.6	57.0	15.35	3801.00	192	114.00	1	8	1	7
39	50.0	59.4	58.8	15.75	3901.00	198	119.50	1	9	1	8
40	51.5	61.2	60.6	16.15	4001.00	204	125.00	2	0	1	9
41	52.5	62.4	61.8	16.55	4101.00	208	130.50	2	1	2	0
42	54.0	64.2	63.6	16.95	4201.00	214	136.00	2	2	2	1
43	55.0	65.4	64.8	17.35	4301.00	218	141.50	2	3	2	2
44	56.5	67.2	66.6	17.75	4401.00	224	147.00	2	4	2	3
45	57.5	68.4	67.8	18.15	4501.00	228	152.50	2	5	2	4
46	59.0	70.2	69.6	18.55	4601.00	234	158.00	2	6	2	5
47	60.0	71.4	70.8	18.95	4701.00	238	163.50	2	7	2	6
48	61.5	73.2	72.6	19.35	4801.00	244	169.00	2	8	2	7
49	62.5	74.4	73.8	19.75	4901.00	248	174.50	2	9	2	8
50	63.5	76.2	75.6	20.15	5001.00	254	180.00	3	0	2	9
51	65.5	78.0	77.4	20.55	5101.00	260	185.50	3	0	3	0
52	66.5	79.2	78.6	20.95	5201.00	264	191.00	3	0	3	0
53	68.0	81.0	80.4	21.35	5301.00	270	196.50	3	0	3	0
54	69.0	82.2	81.6	21.75	5401.00	274	202.00	3	0	3	0
55	70.5	84.0	83.4	22.15	5501.00	280	207.50	3	0	3	0
56	71.5	85.2	84.6	22.55	5601.00	284	213.00	3	0	3	0
57	73.0	87.0	86.4	22.95	5701.00	290	218.50	3	0	3	0
58	74.0	88.2	87.6	23.35	5801.00	294	224.00	3	0	3	0
59	75.5	90.0	89.4	23.75	5901.00	300	229.50	3	0	3	0
60	77.0	91.8	91.2	24.15	6001.00	306	235.00	3	0	3	0
61	78.0	93.0	92.4	24.55	6101.00	310	240.50	3	0	3	0
62	79.5	94.8	94.2	24.95	6201.00	316	246.00	3	0	3	0
63	80.5	96.0	95.4	25.35	6301.00	320	251.50	3	0	3	0
64	82.0	97.8	97.2	25.75	6401.00	326	257.00	3	0	3	0
65	83.0	99.0	98.4	26.15	6501.00	330	262.50	3	0	3	0
66	84.5	100.8	100.2	26.55	6601.00	336	268.00	3	0	3	0

	ABS related Data Configuration				Transmission related Data Configuration						
PID	84	117	118	168	191	120	177	162		163	
Step	Road Speed (MPH)	Primary Pressure (PSI)	Second. Pressure (PSI)	Battery Potential (V)	Output Shaft Speed (RPM)	H-retarder Oil Temp. (F)	Tran. #1 Oil Temp (F)	Range Selected		Range Attained	
67	85.5	102.0	101.4	26.95	6701.00	340	273.50	3	0	3	0
68	87.0	103.8	103.2	27.35	6801.00	346	279.00	3	0	3	0
69	88.0	105.0	104.4	27.75	6901.00	350	284.50	3	0	3	0
70	89.5	106.8	106.2	28.15	7001.00	356	290.00	3	0	3	0
71	91.0	108.6	108.0	28.55	7101.00	362	295.50	3	0	3	0
72	92.0	109.8	109.2	28.95	7201.00	366	301.00	3	0	3	0
73	93.5	111.6	111.0	29.35	7301.00	372	306.50	3	0	3	0
74	94.5	112.8	112.2	29.75	7401.00	376	312.00	3	0	3	0
75	96.0	114.6	114.0	30.15	7501.00	382	317.50	3	0	3	0
76	97.0	115.8	115.2	30.55	7601.00	386	323.00	3	0	3	0
77	98.5	117.6	117.0	30.95	7701.00	392	328.50	3	0	3	0
78	99.5	118.8	118.2	31.35	7801.00	396	334.00	3	0	3	0
79	101.0	120.6	120.0	31.75	7901.00	402	339.50	3	0	3	0
80	102.5	122.4	121.8	32.15	8001.00	408	345.00	3	0	3	0
81	103.5	123.6	123.0	194.35	8420.00	412	350.50	3	0	3	0
82	105.0	125.4	124.8	356.60	8839.25	418	356.00	3	0	3	0
83	106.0	126.6	126.0	518.85	9258.50	422	361.50	3	0	3	0
84	107.5	128.4	127.8	681.10	9677.75	428	367.00	3	0	3	0
85	108.5	129.6	129.0	843.30	10096.75	432	372.50	3	0	3	0
86	110.0	131.4	130.8	1005.55	10516.00	438	378.00	3	0	3	0
87	111.0	132.6	132.0	1167.80	10935.25	442	383.50	3	0	3	0
88	112.5	134.4	133.8	1330.05	11354.50	448	389.00	3	0	3	0
89	113.5	135.6	135.0	1492.25	11773.50	452	394.50	3	0	3	0
90	115.0	137.4	136.8	1654.50	12192.75	458	400.00	3	0	3	0
91	116.5	139.2	138.6	1816.75	12612.00	464	1179.00	3	0	3	0
92	117.5	140.4	139.8	1979.00	13031.25	468	1958.25	3	0	3	0
93	119.0	142.2	141.6	2141.20	13450.25	474	2737.50	3	0	3	0
94	120.0	143.4	142.8	2303.45	13869.50	478	3516.50	3	0	3	0
95	121.5	145.2	144.6	2465.70	14288.75	484	4295.75	3	0	3	0
96	122.5	146.4	145.8	2627.95	14708.00	488	5075.00	3	0	3	0
97	124.0	148.2	147.6	2790.15	15127.00	494	5854.00	3	0	3	0
98	125.0	149.4	148.8	2952.40	15546.25	498	6633.25	3	0	3	0
99	126.5	151.2	150.6	3114.65	15965.50	504	7412.50	3	0	3	0
100	127.5	153.0	153.0	3276.75	16383.75	510	8191.75	3	0	3	0

Chapter 6 Appendix

6.1 Remote Terminal Installation Guide

A remote terminal program can be used to control and display detailed information of simulated J1708 signals on a PC screen. The flowing is a step by step guide on how to install the Remote Terminal program.

Figure 6-1

1. Double-click the “Au Setup J1708 Simulator Remote Terminal V1.00A Build 05112022-01” application file in the software disc, as shown in Figure 6-1.
2. A “License Agreement” window will pop up. Please read the license agreement and select “I accept the agreement”. Click “Next” to continue (Figure 6-2).

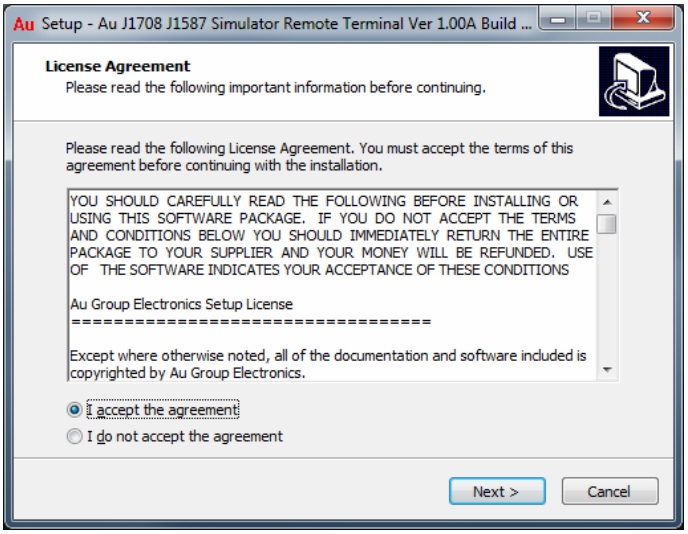


Figure 6-2

3. A “Select Destination Location” window will pop up. Use the default folder, and click “Next” to continue (Figure 6-3).

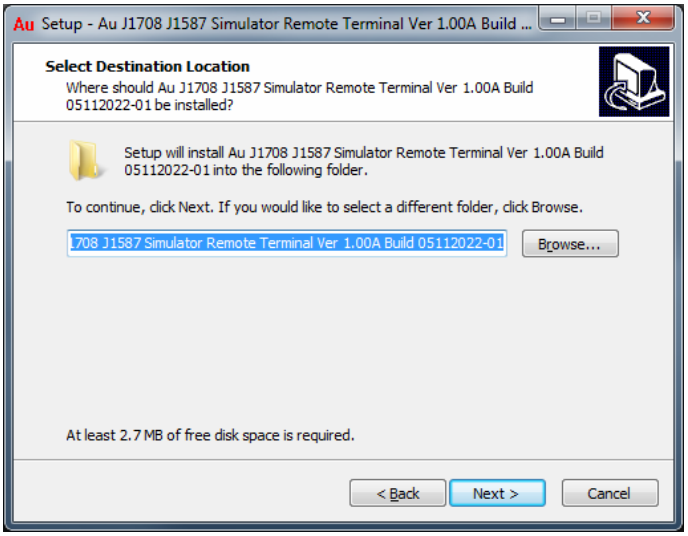


Figure 6-3

4. A “Select Start Menu Folder” window will pop up. Use the default folder, and click “Next” to continue (Figure 6-4).

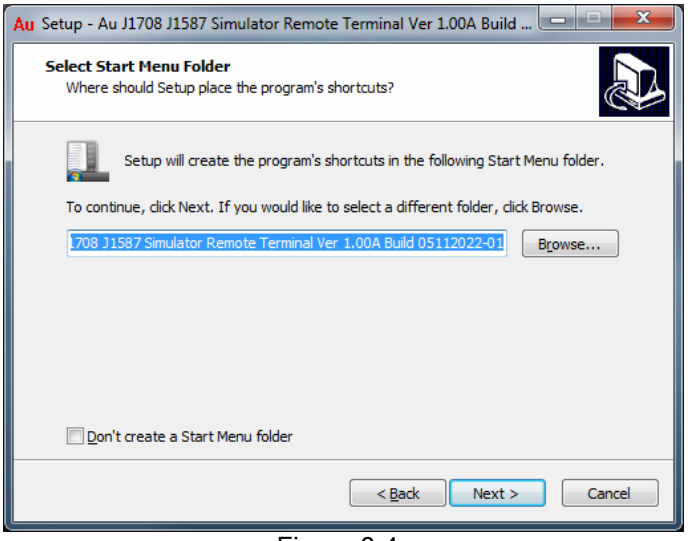


Figure 6-4

5. A “Select Additional Tasks” window will pop up. Check both “Create a desktop icon”, and “Create a Quick Launch icon”, click “Next” to continue (Figure 6-5).

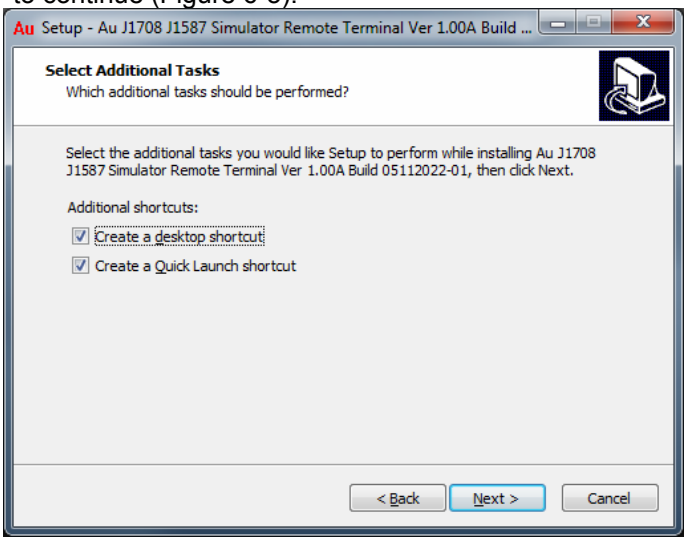


Figure 6-5

6. A “Ready to Install” window will pop up. Click “Install” (Figure 6-6)

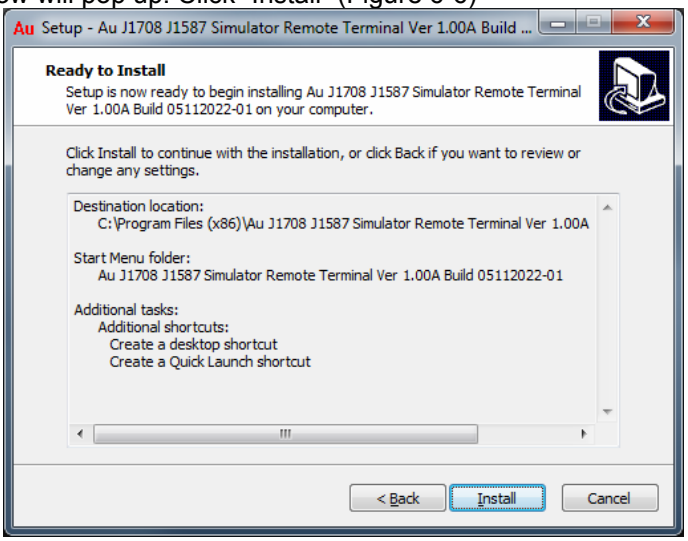


Figure 6-6

7. Check "Launch Au J1708 Simulator Remote Terminal Version 1.00A". Click "Finish" (Figure 6-7), Au J1708 Simulator Remote Terminal will be launched (as shown in Figure 3-1).

Figure 6-7

6.2 License Management

Upgrading Au J1708/J1587 Simulator license can be done in-field in a few seconds.

6.2.1 What is needed to upgrade Au J1708/J1587 Simulator License?

1. Order license upgrade code from the following web link (Item #: LICJ1708-XXX, refer to figure 1- 7 for detail) : https://www.auelectronics.com/System-J1708Simulator.htm
2. A PC equipped with a serial port and a RS232 Serial extension cable (part # CBL-RS232-01) or a PC equipped with a USB port and a "USB to Serial Converter Cable" (part #: CBL-USB-232).
3. Au J1708/J1587 Simulator.
4. Au J1708/J1587 Simulator Remote Terminal. (Refer to Appendix A for how to install)

6.2.2 Step by Step License Upgrading Procedure

1. Connect your PC with Au J1708/J1587 Simulator.
2. Launch Au J1708/J1587 Simulator Remote Terminal program. Select the serial communication port that was used to connect J1708/J1587 Simulator, e.g. COM1, then click “Connect” button, notice the Product ID shows "Value Package” (Figure 6-8)

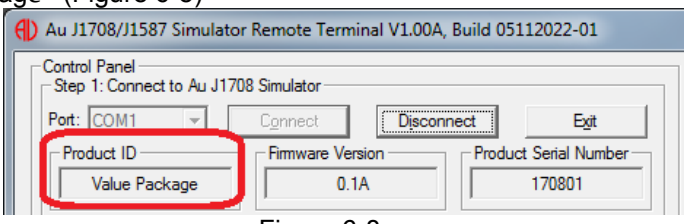


Figure 6-8

3. Click the Au Logo on the top left corner of Au J1708 Simulator Remote Terminal, then click "About J1708 Simulator …” as shown in Figure 6-9.

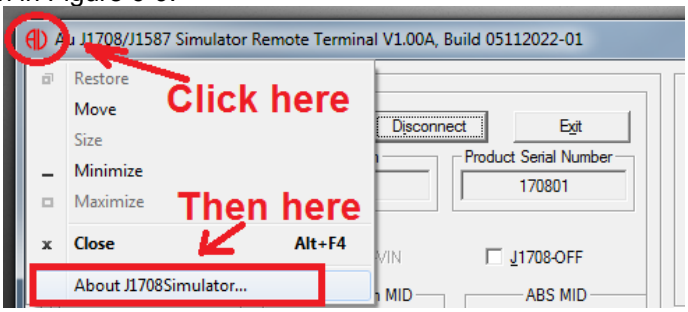


Figure 6-9

4. A "About Au J1708/J1587 Simulator" window will pop up (Figure 6-10). Enter a validate license code, and then click "Validate license" button to continue.

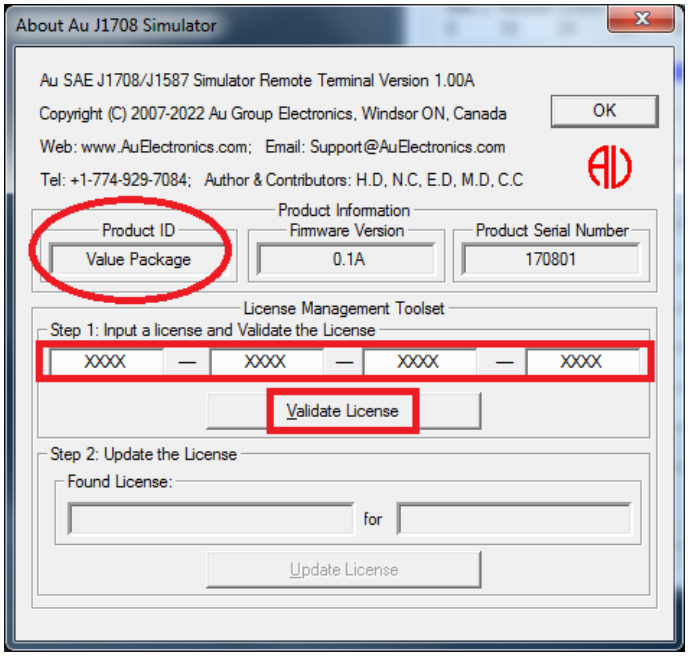


Figure 6-10

5. Each Au J1708/J1587 Simulator will have a unique Serial Number and may have a different Product ID (J1708/J1587 Simulator Edition). If the license code is invalid, an error message will pop up, as shown in Figure 6-11

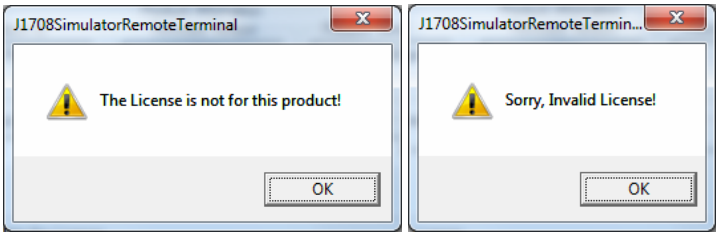


Figure 6-11

6. After a valid license is entered, Updated license information will display. As demonstrated below in Figure 6-12, J1708 Simulator Value Package edition will be upgraded to Vehicle Platinum Script Edition. Click "Update License" button.

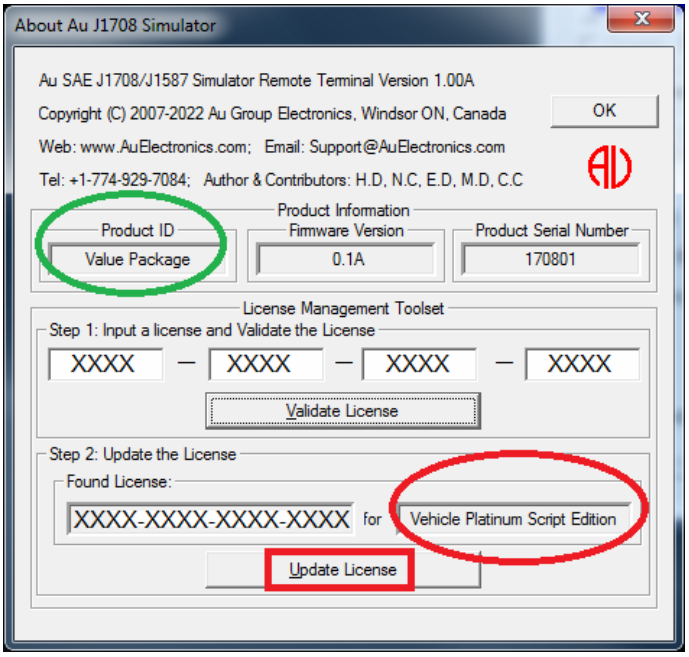


Figure 6-12

7. When it is updated successfully, a beep will be heard. About J1708 Simulator window will close automatically, and the Product ID (Edition of J1708/J1587 Simulator) will update to the new edition (Vehicle Platinum Script Edition in this demonstration, as shown in Figure 6-13).

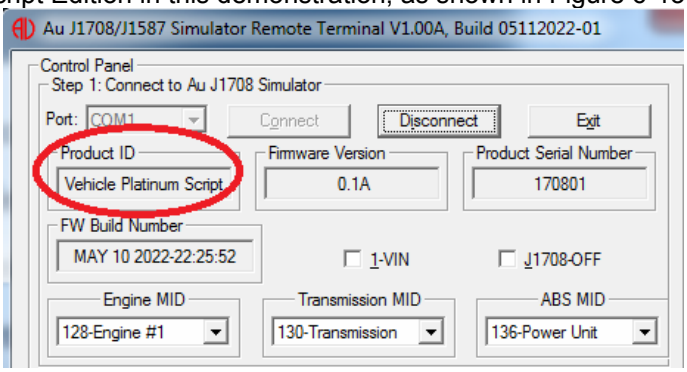


Figure 6-13

6.3 *Firmware upgrade with Au PIC Serial Boot-loader*

With the built-in Serial Boot-loading feature, future released firmware of Au J1708/J1587 Simulator can be in-field updated in a few minutes.

6.3.1 What's needed Before Installing Au PIC Boot-loader?

1. A PC equipped with serial port or PC equipped with a USB port and a "USB to Serial convert cable".
2. Serial cable to connect a PC to a PIC target board.
3. Au PIC Boot-loader installation program (it is available through Au Group Electronics)
4. An encrypted PIC-code file with extension of "Aud" (it will be provided by Au Group Electronics for different products, e.g. Au J1708/J1587 Simulator, etc.)

6.3.2 How to Install Au PIC Boot-loader?

Note: If you have previously installed the Au PIC Boot-loader on your PC, please skip step 1 to step 8, and start with step 9.

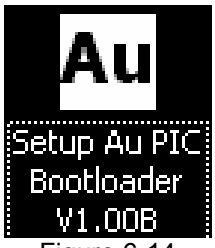


Figure 6-14

1. Double-click icon of the "Setup Au PIC Boot-loader V1.00B" to start installing Au PIC Boot-loader, as shown in Figure 6-14
2. "Welcome to the Au PIC Boot-loader Ver 1.00B Setup Wizard" window show up, click "Next" (Figure 6-15)

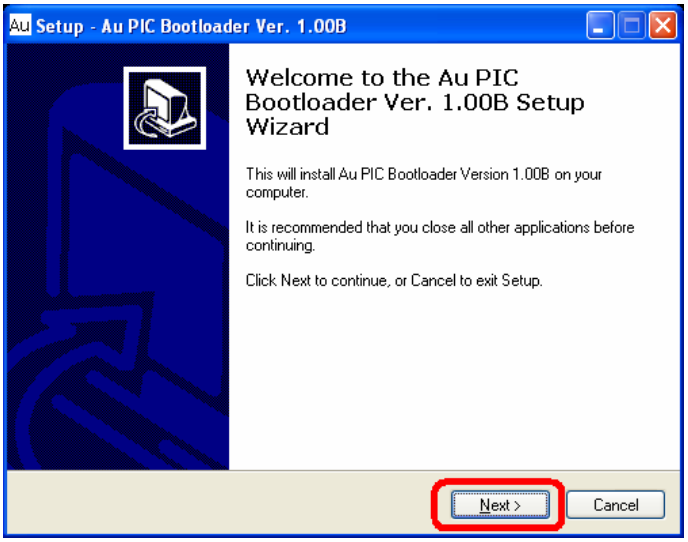


Figure 6-15

3. A "License Agreement" window will pop up, read the license agreement and select "I accept the agreement", then click "Next" to continue (Figure 6-16).

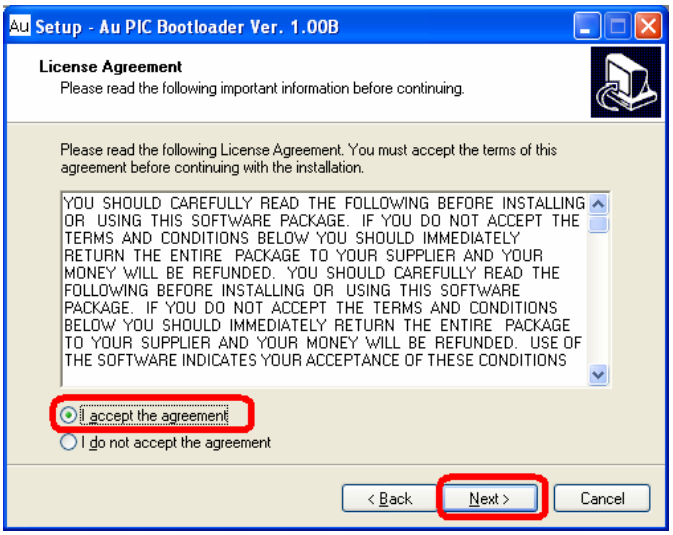


Figure 6-16

4. A “Select Destination” window will pop up, use default path: C:\Program Files\ AU PIC Bootloader”, then click “next” to continue (Figure 6-17).

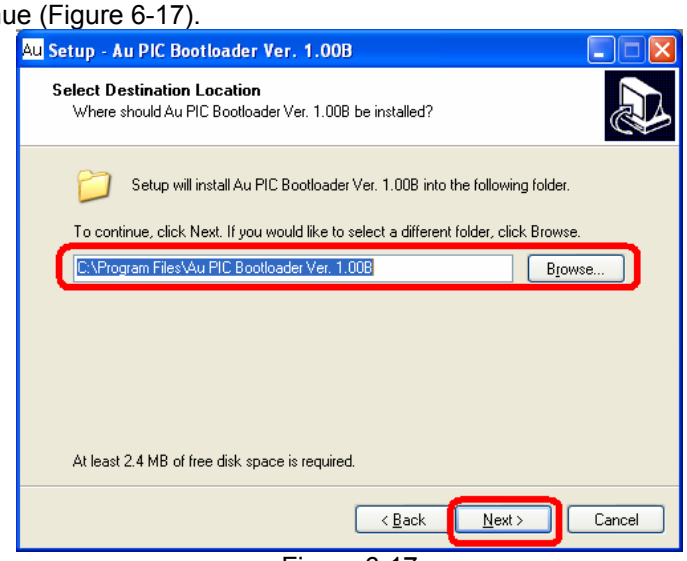


Figure 6-17

5. A “Select Start Menu Folder” window will pop up, use default setting “AU PIC Boot-loader”, then click “next” (Figure 6-18).

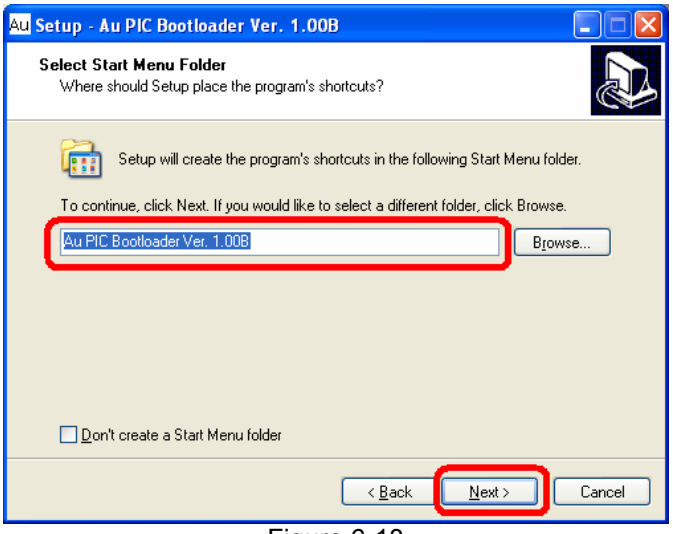


Figure 6-18

6. A “Select Additional Task” window will pop up, check both “Create a desktop icon” and “Create a quick launch icon”, and then click “next” to continue (Figure 6-19).

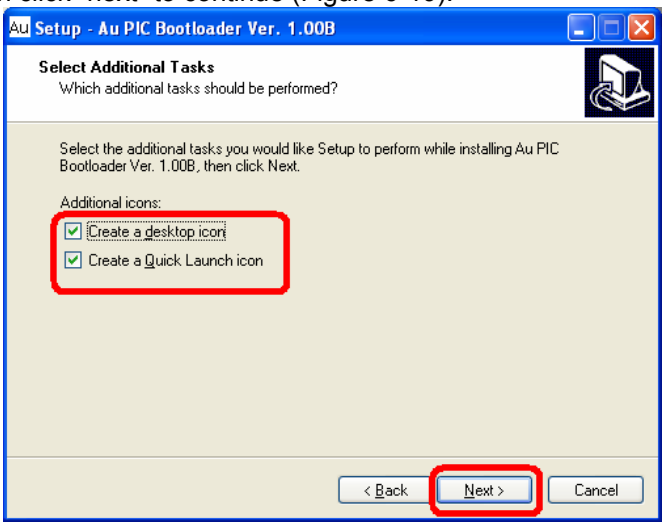


Figure 6-19

7. A “Ready to Install” window will pop up. Click “Install” (Figure 6-20).

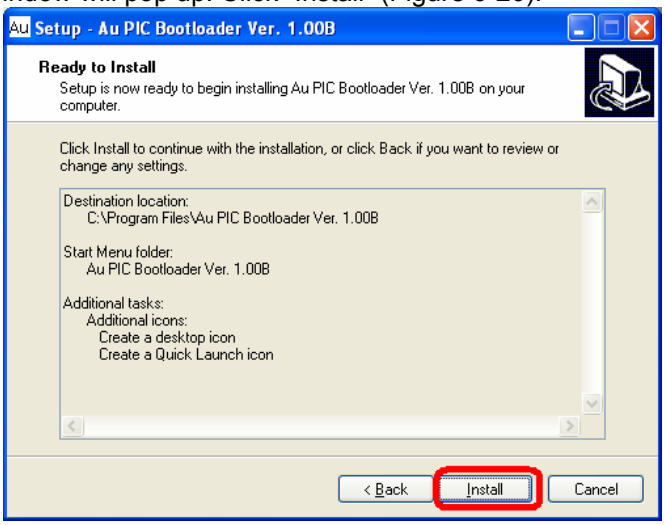


Figure 6-20

8. After a few seconds, A “Completing the Au PIC Boot-loader Setup Wizard” window will pop up, check “Launch Au PIC Boot-loader Ver. 1.00B”, click “Finish” to exit setup (Figure 6-21).

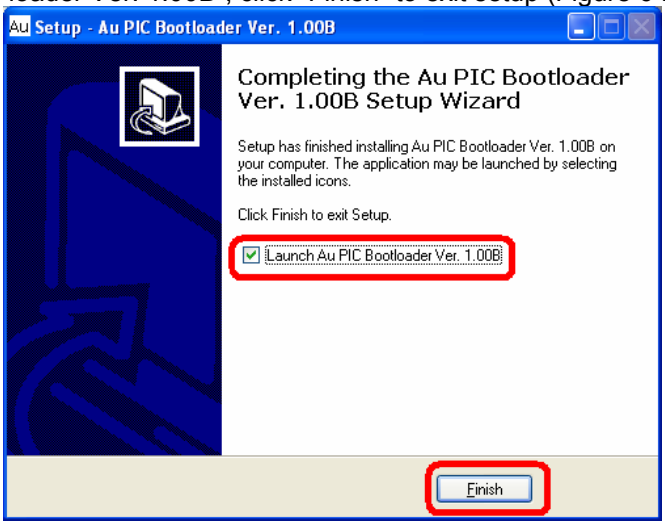


Figure 6-21

9. Au PIC Boot-loader is launched, as shown in Figure 6-22

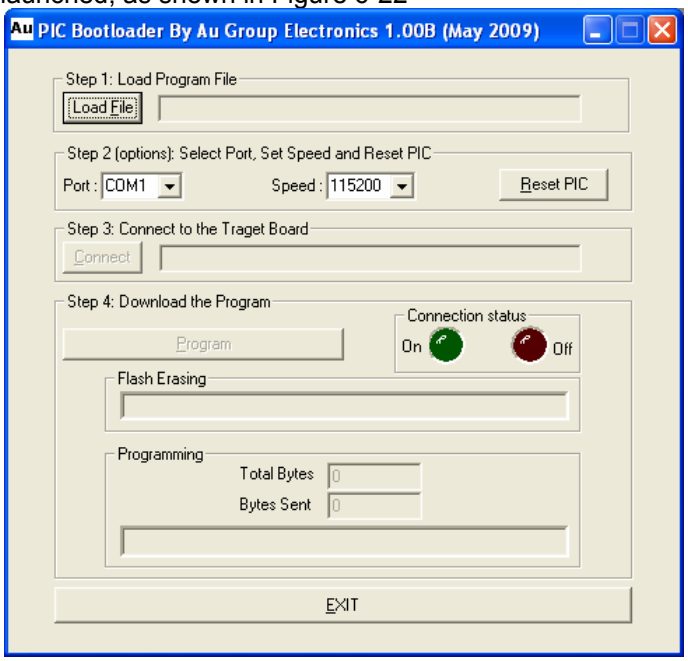


Figure 6-22

6.3.3 How to Use Au PIC Boot-loader?

Note: Following will demonstrate how to use Au PIC Boot-loader to upgrade Au J1708 Simulator firmware from 0.1A to 0.2A.

Step 1. Load Program File:

Connect Au J1708 Simulator to a PC, and click the "Load File" button (Figure 6-23). Select file type with ".Aud" extension, and click "Open"

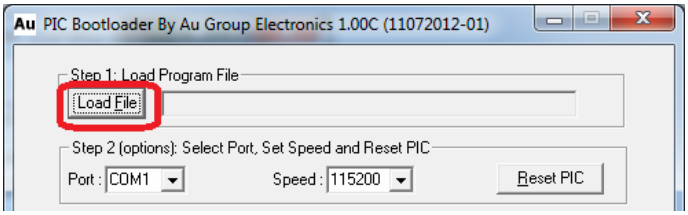


Figure 6-23

Step 2. Select port, set speed, Reset PIC and Connect

- Select the proper serial communication port, which is used to connect with Au J1708 Simulator.
- Set the communication Baud Rate to 115200 bps
- Click "Reset PIC" button. the "**Warning**" LED on the device will blink.
- Within 10 seconds, click "Connect" button (Figure 6-24).

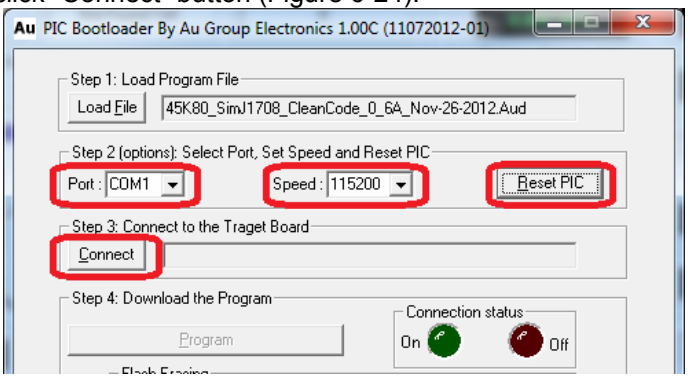


Figure 6-24

Note: There is a 10-second time-out period to let the Boot-loader program connect with Au J1708 Simulator, if user failed to do so, please click “Reset PIC”.
During programming, the " **Warning** "LED on Au J1939 Simulator will be constantly on, along with the connection status indicator – the Green light on Au PIC Boot-loader GUI will be on. Notice that “Program” button now has been activated and the target board PIC Boot-loader information "Au--232E6" will show up, as shown in Figure 6-25.

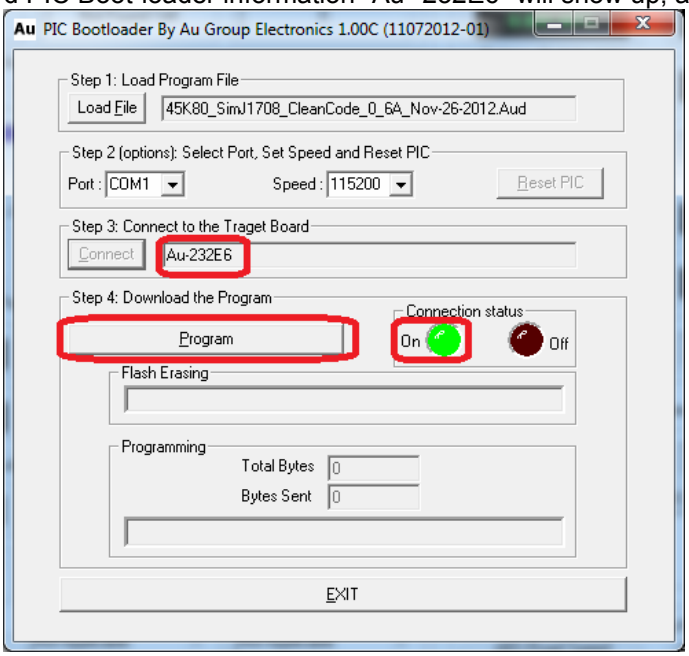


Figure 6-25

Step 3. **<u>Download program to Au J1708/J1587 Simulator</u>**

Click “Program” button (Figure B-12).
The flash of the Au J11708 Simulator will be erased first, it will take a few seconds. Then the pre-loaded "xxxx.Aud" file will be programmed into Au J1708 Simulator, with the programming status progressing in the progress bar (Figure 6-26).

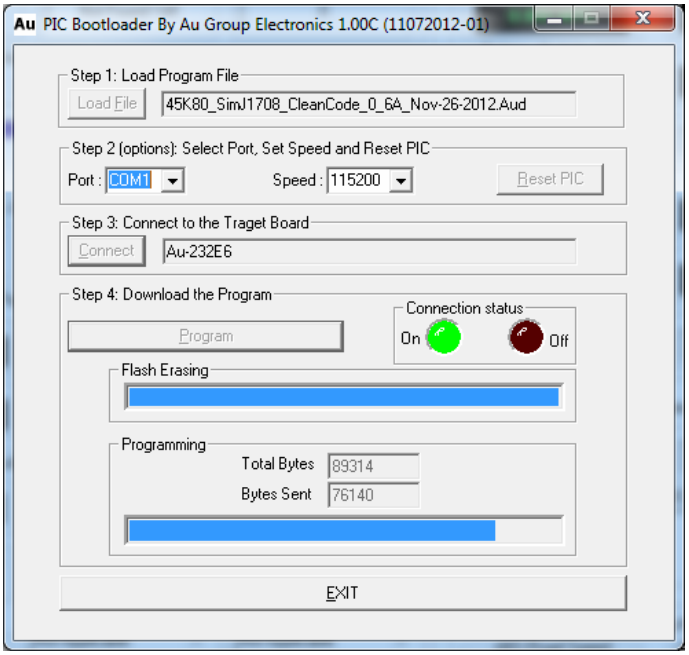


Figure 6-26

This process may take a few minutes depending on the file size and communication speed. When programming finished, click “EXIT” to exit Boot-loader mode (Figure 6-27).

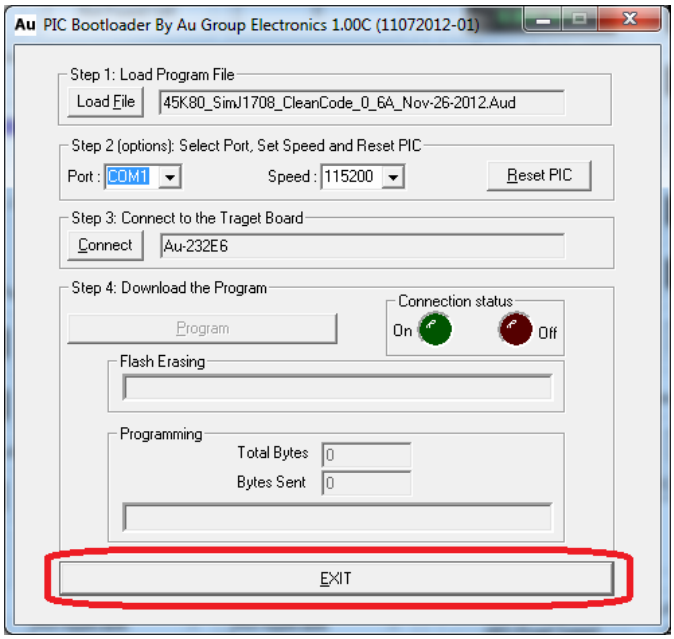


Figure 6-27

The new Au J1708 Simulator firmware has been upgraded to the device.

Thank You

Thank you for choosing Au Group Electronics products.
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We look forward to serving you again in the near future.