



SURFACE VEHICLE RECOMMENDED PRACTICE

J2534™-2/4_0500

JAN2022

Issued

2022-01

Pass-Thru Extended Feature - HONDA_DIAGH

RATIONALE

Each of the features contained in the original SAE J2534-2 document (API version 04.04) is being published as a separate document for ease of maintenance and extensibility. At the same time, these features are being updated to be compatible with SAE J2534-1_0500 (API version 05.00) and to address feedback from the field.

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Document Sharing Hub

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1. SCOPE

This SAE Recommended Practice is part of the SAE J2534-2/X_0500 set of documents that extends the SAE J2534-1_0500 API (version 05.00) specification, and defines how to implement HONDA_DIAGH within the SAE J2534 API framework. This document details only the changes from SAE J2534-1_0500 and items not specifically detailed in this document are assumed to have not changed.

An SAE J2534-2/4_0500 interface shall be compliant to the HONDA_DIAGH feature only when all the required functionality in this SAE Recommended Practice is implemented. Any functionality not required for compliance will be specifically marked as “optional” in this document.

This document must be used in conjunction with the SAE J2534-2/BA_0500 and SAE J2534-2/RE_0500 documents.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J2534-1_0500 Recommended Practice for Pass-Thru Vehicle Programming (API version 05.00)

SAE J2534-2/BA_0500 Pass-Thru Extended Features - Base Document (API version 05.00)

SAE J2534-2/RE_0500 Pass-Thru Extended Features - Resource Document (API version 05.00)

SAE J2809 Honda Diagnostic Serial Data Link Protocol - ABS/VSA System

2.1.2 ISO Documents

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 9141:1989 Road Vehicles - Diagnostic Systems - Requirements for Interchange of Digital Information

ISO 9141-2:1994 Road Vehicles - Diagnostic Systems - CARB Requirements for Interchange of Digital Information

3. DEFINITIONS

HONDA_DIAGH: Honda proprietary single wire UART based diagnostic communication bus.

92Hm/2: Honda proprietary diagnostic communication protocol.

ACTIVE MESSAGE: Refers to a message that has started the transmission process on the physical vehicle bus but has not completed it.

LOGICAL COMMUNICATION CHANNEL: A specific path through the pass-thru interface to the physical vehicle bus that uses an existing physical communication channel but adds the network and transport layers (as defined by OSI).

PASS-THRU DEVICE: Refers only to the hardware portion of the SAE J2534 interface.

PASS-THRU INTERFACE: Refers to all components of a SAE J2534 interface, including both physical hardware and software.

PHYSICAL COMMUNICATION CHANNEL: A specific path through the pass-thru interface to the physical vehicle bus that encompasses the physical layer and data link layer (as defined by OSI) and includes all the associated physical resources (such as, the data link controller, connector, pins, etc.) in the pass-thru device.

QUEUED MESSAGE: Refers to a full message from the application that has been accepted by the pass-thru interface (via the API) for transmission, which is intended to become an active message at some point in the future.

TERMINATE A MESSAGE: Refers to the process of stopping reception or transmission of a message by the pass-thru interface.

TRANSMITTED MESSAGE: Refers to a previously active message that has been successfully transmitted on the physical vehicle bus.

4. ACRONYMS

API	Application Programming Interface
DLL	Dynamic Link Library
Ioctl	Input/Output Control
IoctlID	Identifier Assigned to a Specific ioctl
ISO	International Standards Organization
RX	Receive
TX	Transmit

5. DOCUMENTATION CONVENTIONS

In the document body and in tables:

- All SAE J2534 API functions shall be in bold print (for example, **PassThruOpen**).
- All SAE J2534 API variables shall be enclosed in "<>" (for example, <DeviceID>).
- All SAE J2534 API DEFINES shall be in upper-case print (for example, STATUS_NOERROR).
- All number shall be in decimal unless otherwise indicated. (Hexadecimal values shall have a leading "0x"; for example, 0x7AF or 0x800 are hexadecimal values.)

6. PASS-THRU INTERFACE REQUIREMENTS

The HONDA_DIAGH protocol shall be implemented as a physical communication channel and cannot be implemented on a logical communication channel.

The HONDA_DIAGH protocol has been defined to indicate the use of a bi-directional serial communication line that provides diagnostic communication capability using the "92Hm/2" communication protocol which is Honda proprietary and has been documented in the SAE J2809 specification. HONDA_DIAGH line is a single wire communication bus based on a UART interface.

The HONDA_DIAGH physical interface supports the 92Hm/2 diagnostic communication protocol that is a UART based protocol operating at 9600 baud. The SAE J2534-2/4_0500 support of this protocol is based on the existing SAE J2534-1_0500 definitions for ISO 9141. ISO 9141 timing parameters are used. No support for 5 baud or fast initialization is required. The interface is not required to perform any message transmission retries. Retries shall be handled by the application.

6.1 Specific Protocol Requirement

The HONDA_DIAGH feature shall meet the requirements outlined in this section.

6.1.1 Serial Communication Interface/Protocol

[Table 1](#) describes the serial interface of Honda DIAG-H communication.

Table 1 - Serial interface parameters

Signal Line	"DIAG- H"; Bidirectional, Half - Duplex
	Voltage Drive (0 to 5 V)
Communication Speed	9600 bps
Bit Encoding	NRZ
	Asynchronous
Byte Frame Format	1 start bit, 8 data bits, 1 stop bit
	No parity bit
Network Access	Master/slave
	Single request/single response
	(Any initialization process such as ISO 9141-2 is NOT required)
Message Format	Honda 92 message format; defined by HONDA

6.1.2 Electrical Characteristics of Interface

This section states the requirements of the serial communication interface of the off-board diagnostic tester to communicate with the ECU on the Honda vehicles through DIAG-H bus line.

6.1.2.1 Electrical Characteristics

Table 2 - Electrical characteristics

Item	Requirements	Description
Power Supply Voltage (Vcc)	5.0 V $\pm$ 5%	Voltage of power supply to DIAG-H line
Capacitance (C _T)	Less than 2000 pF	Total capacitance of tester and all its cabling (Figure 1)
Pull-up Resistance	4.7 k Ω $\pm$ 5%	Resistance pull-up to Vcc

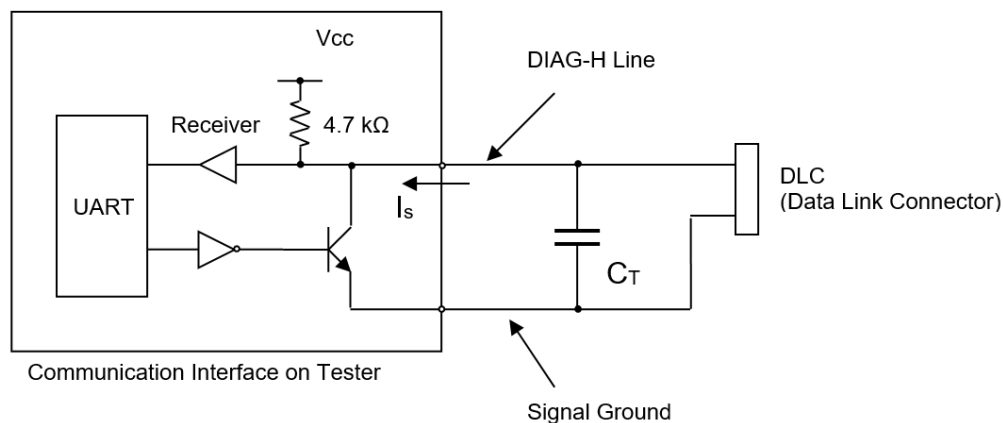


Figure 1 - Recommended interface circuit on tester

6.1.2.2 Requirements of Transmitter

Table 3 - Transmitter electrical requirements

Item	Requirements	Description
Logic “0” Voltage	Less than 0.5 V	Output voltage at logic “0”
Sink Current (IS)	More than 50 mA	Sink Current at logic “0” (see Figure 1)
Logic “1” Voltage	More than 4.5 V	Output voltage at logic “1” with the load shown in Figure 2

Table 4 - Transmitter timing requirements

Item	Requirements	Condition
Transmission Speed	9600 bps ± 0.2%	At DLC terminal
tDST (see Figure 3)	5.0 seconds	Disconnected from vehicle

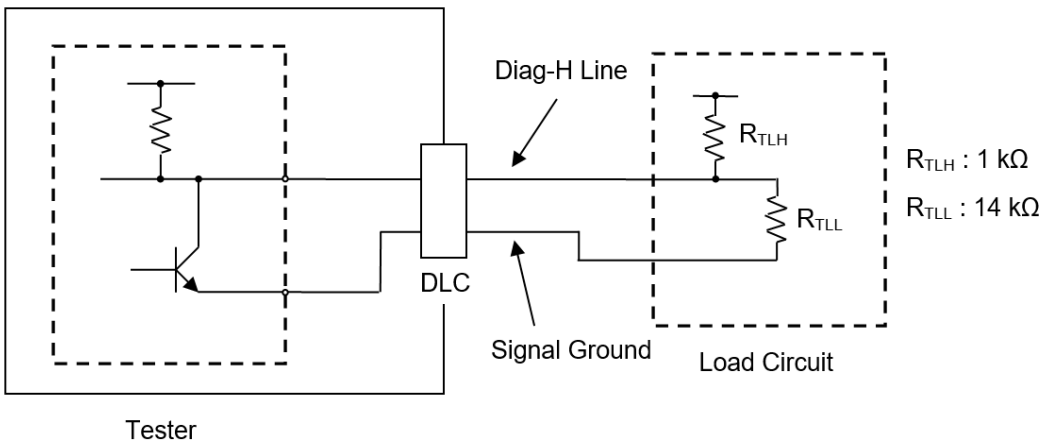
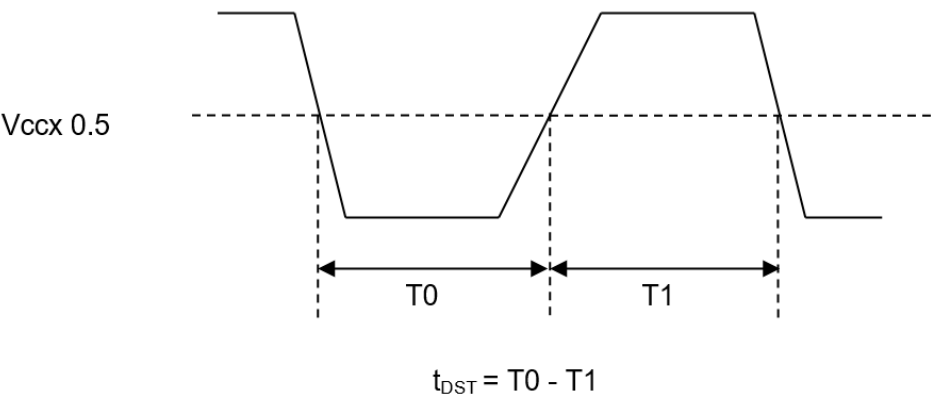


Figure 2 - Load circuit



“ t_{DST} ” is defined as time difference between duration of logic “0” and “1,” when “0” and “1” bits are transmitted alternately.

Figure 3 - Definition of t_{DST}

6.1.2.3 Requirements of Receiver

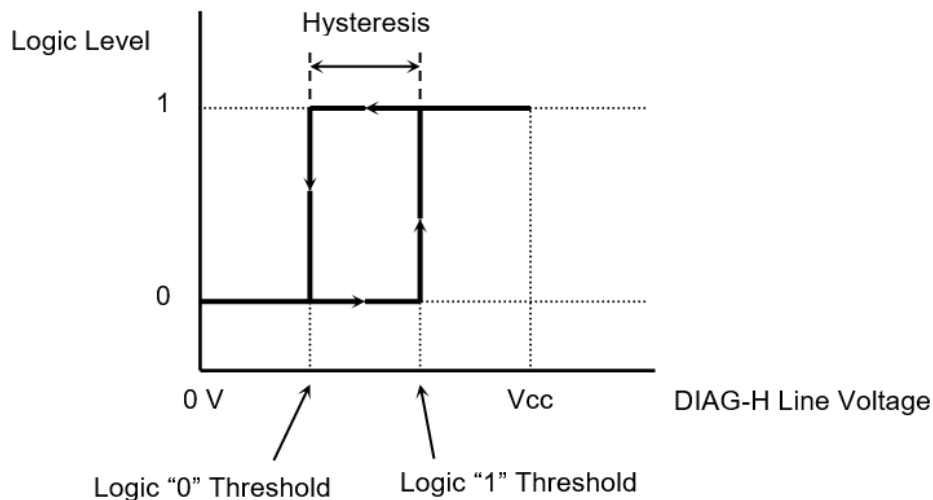
Table 5 - Receiver electrical requirements

Item	Requirements	Description
Logic "0" Threshold	More than 1.9 V	Threshold voltage to determine logic "0"
Logic "1" Threshold	Less than 3.1 V	Threshold voltage to determine logic "1"
Internal Resistance	More than 100k $\pm$ (to signal ground) more than 4.4k Ω (to Vcc)	Internal resistance in receiving state
Hysteresis	More than 0.4 V	Difference of threshold voltage between "0" and "1"

Table 6 - Receiver timing requirements

Item	Requirements	Condition
Acceptable Communication Speed	9600bps $\pm$ 1.5%	With wiring and ECUs ⁽¹⁾
t _{DST} (see Figure 3)	$\pm$ 17.0 seconds	

⁽¹⁾ Total capacitance of vehicle: Less than 2700 pF. ECU pulled-up resistor to Vcc: 4.7k $\pm$ 5% (max seven units).

**Figure 4 - Threshold voltage**

6.2 Simultaneous Communication on Multiple Protocols

The interface shall be capable of simultaneous communication with one of the protocols from data link set DATA LINK SET 1, one of the protocols from DATA LINK SET 2, and one of the protocols from DATA LINK SET 3.

Table 7 - Simultaneous communication options

Data Link Set 1	Data Link Set 2	Data Link Set 3
HONDA_DIAGH	ISO 9141 ISO 14230	CAN ISO 15765

6.3 Pin Usage

When the pass-thru interface is initially powered or when the HONDA_DIAGH feature is no longer in use, the pins shall default to high impedance. High impedance is defined as greater than 500k Ω impedance relative to both signal ground and chassis ground.