

# **Intrepid Control Systems, Inc.**

## **Transmit and Receive J1939 Multiframe Message in Vehicle Spy**

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## **1. Introduction:**

Connection Management Transport Protocol of J1939 involves sending “Request to Send” (RTS) messages and “Clear to Send” (CTS) messages back and forth between the transmitting and receiving nodes.

This application note describes how to use J1939 Multiframe message with RTS configuration in Vehicle Spy

## **2. Transmit and Receive J1939 Multiframe Message in Vehicle Spy**

### **2.1 Hardware Setup:**

NeoVI hardware and Vehicle Spy 3

## 2.2 Vehicle Spy Configuration:

### 2.2.1 Enable J1339 option in Vehicle Spy

- Open Vehicle Spy 3.
- Go to Tools → Options → Spy Networks.
- Click to check 'Enable J1939' Check box (Figure 1).
- Press 'OK' button

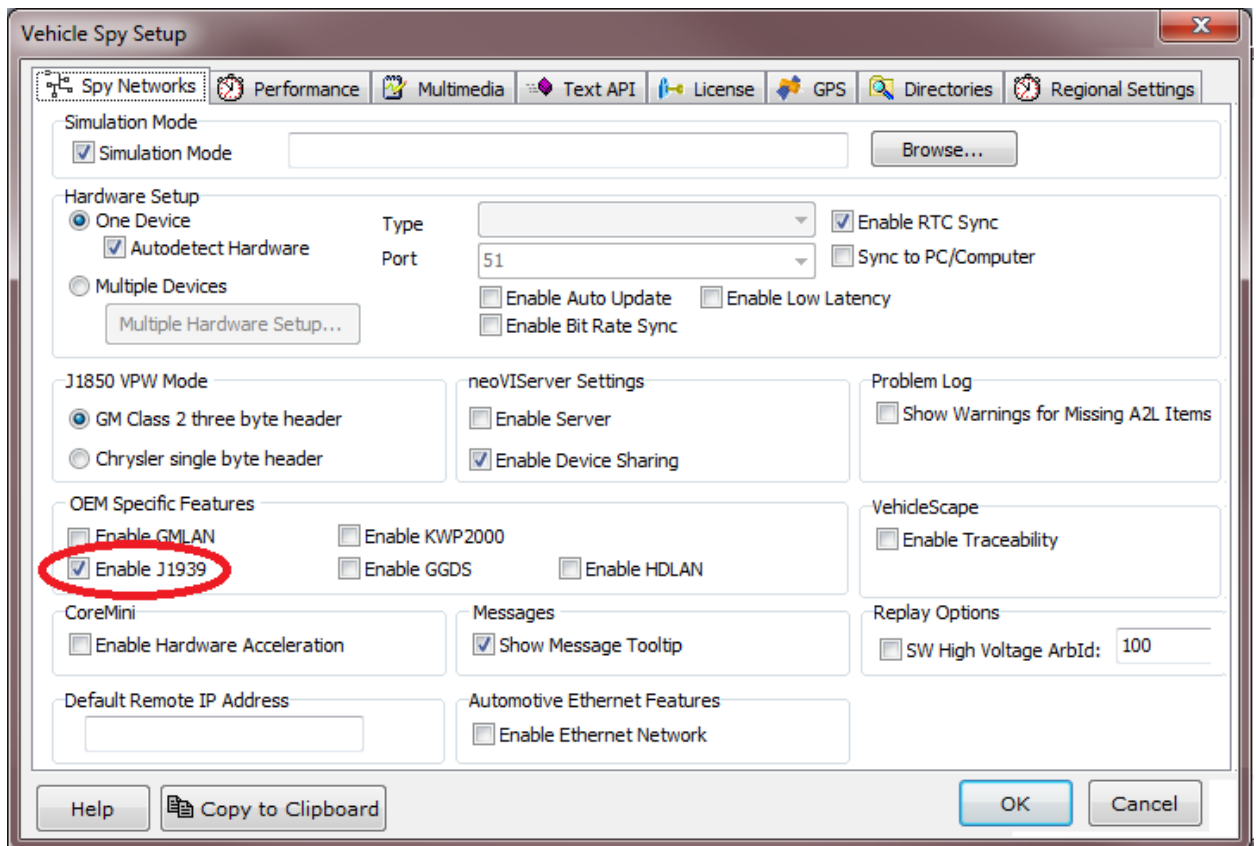


Figure 1: Vehicle Spy setup to enable J1939

## 2.2.2 J1939 Multiframe Transmit Message configuration (Transmitter Node)

Please refer 'Transmitter Node.vs3zip' in the [AN-ICSI-1013\\_configs.zip](#) folder

- Open Vehicle Spy.
- Go to 'Spy Networks' and select 'Messages Editor'.
- Select 'Transmit' tab and click '+' to add new messages.
- Write text description of message in 'Description' field (Figure 2(1)).
- Select Message type as Extended 29 bit (Xtd 29 bit) from 'Type' field (Figure 2(2)).
- Select Message type as Extended 29 bit (Xtd 29 bit) from 'Type' field (Figure 2(2)).
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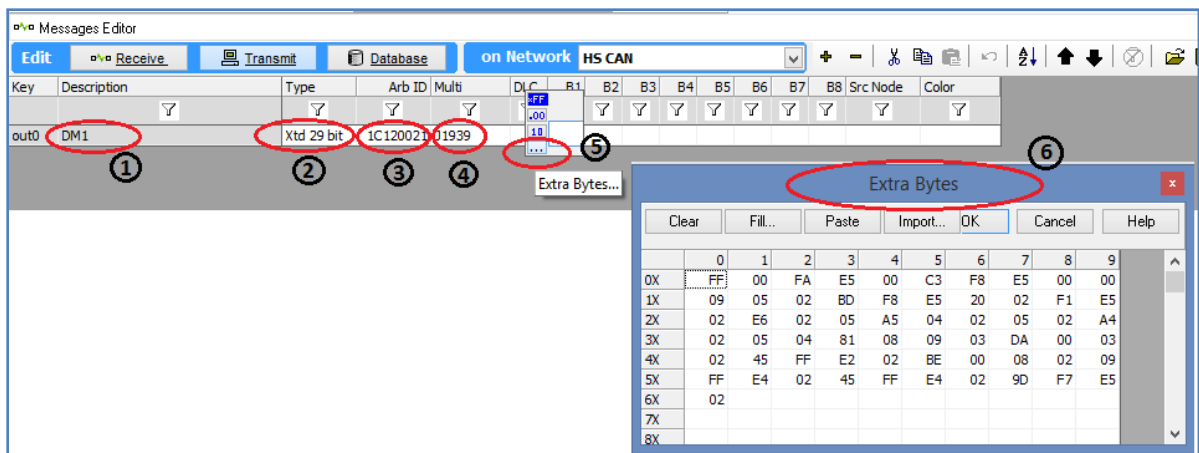


Figure 2: Transmit Message configuration in 'Message Editor'

- Set Message Arbitration Id in ‘Arb ID’ field (Figure 2(3)).
- Select Message type as ‘J1939’ from ‘Multi’ field. (Figure 2(4)).
- To add long message data bytes:
  - Double Click on B1 field, select ‘...’ / ‘Extra Bytes...’ option (Figure 2(5)). The ‘Extra Byte’ Window opens up (Figure 2(6)).
  - Fill in message data bytes in this window.
- Select Message Setup → Select message type as ‘J1939’. (Figure 3(1))
- Select priority in ‘Priority’ field (Figure 3 (2)).
- Select PDU Format as ‘PDU 1- Destination’ (Figure 3(3)).
- Enter Parameter Group Number (PGN) in ‘PGN’ field (Figure 3(4)).
- Enter Destination Address in ‘Destination’ field (Figure 3(5)).
- Enter Source Address in ‘Source’ field (Figure 3(6)).
- Setup multiframe message from ‘Multiframe Setup’ option.
- Select J1939 Transport Type as ‘CTS/RTS handshaking’ and set Multipacket Time interval.

**Setup for DM1**

Description: DM1, Enabled: , Source Node: (none), Color: Black, Hotkey: (No Hotkey)

Default Period (ms): , Num Repetitions: 0, Repeat Period (ms):

J1939 Message Filter Specification

Priority	PDU Format	PGN	Destination	Source	Multiframe Message
7	PDU1 - Destination	1200	03	21	J1939

Hex  Dec  Dec: 4800

Signals in Message

Live Edit:

Signals in Message	Type	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Description	Type	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0

Figure 3: Transmit Message Setup configuration in ‘Message Editor’

### 2.2.3 J1939 Multiframe Receive Message configuration (Receiver Node)

Please refer 'Receiver Node vs3zip' from the [AN-ICSI-1013\\_configs.zip](#) folder

#### 2.2.3.1 Receive Multiframe Message configuration:

- Open Vehicle Spy.
- Select 'Spy Networks' → 'Messages Editor'.
- Select 'Receiver' tab and click '+' to add new messages.
- Give text description of message in 'Description' field (Figure 4(1)).

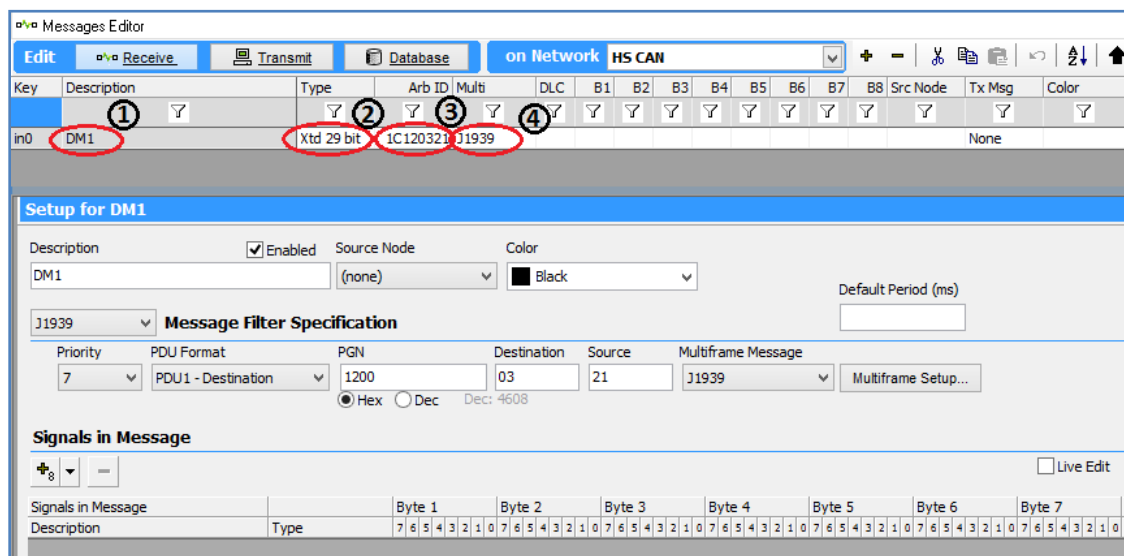


Figure 4: Receive Message configuration in 'Message Editor'

- Select Message type as Extended 29 bit (Xtd 29 bit) from 'Type' field (Figure 4(2)).
- Set Message Arbitration Id in 'Arb ID' field (Figure 4(3)).
- Select Message type as 'J1939' from 'Multi' field. (Figure 4(4)).
- Go to Message Setup and configure J1939 setting as configured for transmit message. (Figure 3)
- Setup multiframe message from 'Multiframe Setup' option. Select J1939 Transport Type as 'CTS/RTS handshaking' and set Multipacket Time interval.

### 2.2.3.2 Claim a J1939 Address in Receiver Node

J1939 requires every node on the network to claim a unique address before transmitting any data. Vehicle Spy supports this requirement with 'J1939 Address Manager' option of Vehicle Spy.

- Go to 'Embedded Tools' and select 'J1939 Address Manager'.
- Select the network from 'Network' field (Figure 5(1)).
- Enter 1 byte Network Address and 8 bytes Network Name (Figure 5(2)).
- Click "Add" button to add the Network Address and name.

The screenshot shows the 'J1939 Address Claiming' window. At the top, the 'Network' dropdown is set to 'HS CAN' (circled 1). Below it, 'Claim on Startup' and 'Request Status on Startup' are both checked. The 'Addresses to Claim' table (circled 3) contains one entry: Address '03' and Network Name '04 04 04 04 04 04 04'. The 'J1939 Network Address Status' table is empty. At the bottom, there are buttons for 'Add', 'Remove', 'Claim Now', 'Release Address', and 'Request Claimed Addresses'. Below the buttons, the 'Network Address' field contains '03' and the 'Network Name' field contains eight '04' characters (circled 2).

Figure 5: Add Network address and Network Name to claim J1939 Address

- Select added address and click the "Claim Now" button to claim the address for Vehicle Spy. If "Claim on Startup" is enabled then Vehicle Spy will automatically claim the address in the table each time it goes online.



- If "Request Status on Startup" is enabled then Vehicle Spy will automatically request to see all addresses already claimed each time it goes online.
- Claimed addresses will display in the table on the right. Vehicle Spy claimed address will display as 'Locally Claimed' address.

## 2.3 Observations:

Go online for ‘Transmitter Node’ and ‘Receiver Node’ vehicle Spy files with different hardware.

- If ‘Claim on Startup’ and ‘Request Status on Startup’ options are enabled in Receiver Node files then Vehicle Spy will send global requests message for Address Claim and Request for status (Figure 6).
- J1939 messages traffic can be observed from the ‘Messages View’ (‘Spy Networks’ → ‘Messages’). View the messages in J1939 format. (select ‘J1939’ option available in ‘Columns’ field at the bottom of Message view)

Count	Time	Tx	Er	Description	PGN	Prior	Src	Dst	DataBytes	Network	Node	ChangeCnt	RTC Time
1				HS CAN \$18EAFFFE	59904	6	FE	FF (global)	00 EE 00	HS CAN		0	2014/10/12 15:...
2	655.426 ms			HS CAN \$18EEFF03	60928	6	03	FF (global)	04 04 04 04 04 04 04 04	HS CAN		0	2014/10/12 15:...

Figure 6: Receiver Node sends global message for Address Claim and Request status

- Press ‘Transmit’ button from Graphical panels of Transmitter Node file. It will transmit J1939 multiframe message and Receiver Node will receive this message. (Figure 7).

Count	Time	Tx	Er	Description	PGN	Prior	Src	Dst	DataBytes	Network	Node	ChangeCnt	RTC Time
1				DM1	4608	7	21	03		HS CAN		0	09:53:31:07028...
J1939:0000 : FF 00 FA E5 00 C3 F8 E5 00 00 09 05 02 BD F8 E5 0010 : 20 02 F1 E5 02 E6 02 05 A5 04 02 05 02 A4 02 05 0020 : 04 81 08 09 03 DA 00 03 02 45 FF E2 02 BE 00 08 0030 : 02 09 FF E4 02 45 FF E4 02 9D F7 E5 02													
1				HS CAN \$18EAFFFE	59904	6	FE	FF (global)	00 EE 00	HS CAN		0	09:53:20:02100...
2	653.760 ms			HS CAN \$18EEFF03	60928	6	03	FF (global)	04 04 04 04 04 04 04 04	HS CAN		0	09:53:20:67457...
9	51.046 ms			HS CAN \$1CEB0321	60160	7	21	03	09 02 9D F7 E5 02 FF FF	HS CAN		8	09:53:31:07028...
1				HS CAN \$1CEC0321	60416	7	21	03	10 3D 00 09 FF 00 12 00	HS CAN		0	09:53:30:61257...
2	459.203 ms			HS CAN \$1CEC2103	60416	7	03	21	13 3D 00 09 FF 00 12 00	HS CAN		1	09:53:31:07629...

Figure 7: Received multiframe message in Receiver Node.

- Claimed addresses by Transmitter Node will display as 'Remotely claimed' on the right ie. J1939 Network Address Status (Figure 8).

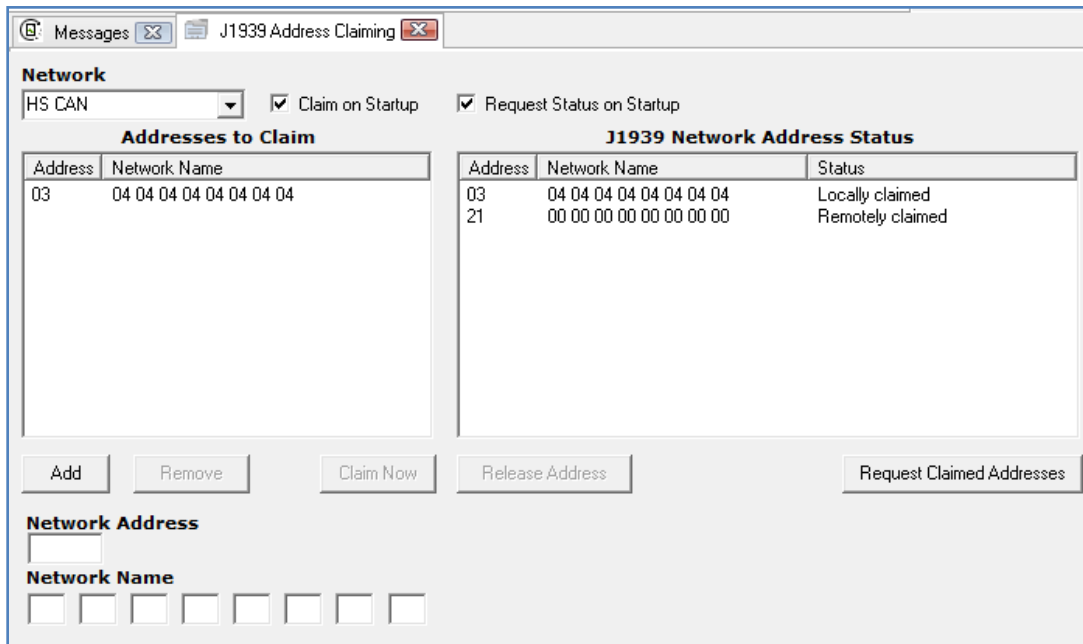
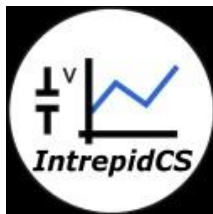


Figure 8: 'Address to claim' and 'Network Address status' view in 'J1939 Address Claiming' tab of Receiver Node.

### 3. Contact Us:



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