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Diagnostic Nozzle Receiver User Manual
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Revision	Name	Title	Signature
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DEFINITIONS AND ABBREVIATIONS

The following terms and abbreviations are used in this manual:

Term	Definition
IR	Infrared—The communication interface the DNR uses to transmit data.
SAE J2799	SAE standard that defines serial packets transmitted via infrared from fuel cell vehicles to hydrogen stations.
DNR	Diagnostic Nozzle Receiver—Tests infrared data communications.
Data message	A single line of SAE J2799 infrared data.

APPLICABLE DOCUMENTS

The following documents are recommended as reference material.

Document Reference	Document Title	Document Number
[1]	SAE J2799-2024: Hydrogen Surface Vehicle to Station Communications Hardware and Software https://www.sae.org/standards/content/j2799_202406	SAE J2799-2024

1 SCOPE

This manual provides an overview of the **Diagnostic Nozzle Receiver (DNR),** a hand-held device used to test infrared (IR) communications received from a hydrogen vehicle's fuelling port.

2 INTRODUCTION

The SAE J2799 standard specifies the infrared communication protocol used by hydrogen surface vehicles to send crucial fuelling information—such as tank pressure and temperature—to fuelling stations during hydrogen refuelling.

The DNR tests and verifies infrared data communication messages received from a hydrogen-powered vehicle's fuelling port. The DNR can wirelessly stream these messages to a remote device for monitoring. **Figure 2-1** below shows the front view of the DNR.

FIGURE 2-1 DNR (DIAGNOSTIC NOZZLE RECEIVER) FRONT VIEW

This manual includes:

- Overview of the DNR:
  - Interface details
  - Changing the batteries

- Basic operation
- Common Diagnostic and Pass/Fail LED status sequences

- Viewing DNR-Received IR Messages on Wireless Devices:
  - Connecting wirelessly to the DNR
  - Launching a terminal emulator
  - Viewing IR messages in the terminal emulator
- Troubleshooting Guidance
- Appendix: Country-specific BT disclosures

3 GETTING STARTED

The DNR tests a hydrogen vehicle's infrared transmitter. It receives SAE J2799 messages from the vehicle's fuelling port, checks their integrity, and displays a pass/fail result. These messages, such as the one below, can be remotely viewed on a laptop for analysis.

```
[2025-02-09 23:44:31.688] Good:|ID=SAE J2799|VN=02.00|TV=0180.0|RT=H70|FC=Halt|MP=064.0|MT=280.0|OD=good|87 4E
```

Figure 3 shows the front of the DNR's infrared receiver.

FIGURE 3 DNR INFRARED RECEIVER LOCATION

Caution: **Smartphone Infrared Interference**

Infrared light from smartphone cameras and other devices may interfere with the DNR. Keep smartphones and infrared-emitting devices away while using the DNR. If interference still occurs, move to a different location and try again.

3.1 DNR USER INTERFACE (UI)

Figure 3-1 **DNR User Interface**, shows the three main UI areas. Table 3-1 details their elements and actions.

1. LED Status Indicators: Power, Data, Pass/Fail, and Diagnostic

2. On/Off Button

3. Wireless Connection Button and Wireless Status LED

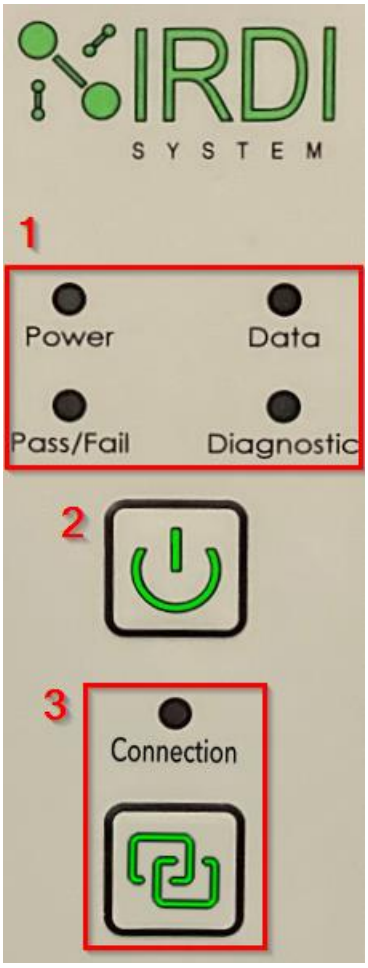

FIGURE 3-1 DNR USER INTERFACE

TABLE 3-1: UI ELEMENTS AND ACTIONS

Button/LED	Action
Power Button	• Press and hold to power the DNR on or off. **NOTE**: The DNR powers off automatically after 5 minutes of inactivity.
Power LED	• **Off**: The DNR is off. • **On**: The DNR is on. Battery is good. • **Slow blink**: The DNR is working. Battery is low. • **Fast blink** (10 seconds): The DNR will power off. Battery is dead.
Connection Button	• Press and hold the button to enable or disable the wireless connection. **NOTE**: The DNR will try to connect wirelessly to a remote device. **NOTE**: The DNR powers off after 5 minutes of inactivity, even in pairing mode.
Connection LED	• **Off**: Connection is disabled. • **Blinks**: While waiting to wirelessly connect to a remote device. • **On**: The DNR has connected wirelessly to a remote device. **NOTE**: The DNR stops pairing after one minute if no connection is established. **NOTE**: The DNR powers off after 5 minutes of inactivity, even while pairing.
Data LED	• **Off**: No J2799 data is available. • **Blinks:** While DNR is receiving data.
Pass/Fail LED	• **Off:** No data. • **Green:** Valid J2799 data. • **Yellow:** DNR disconnected (>5 seconds without data). • **Red:** Invalid J2799 data received (overrides disconnect). **NOTE**: See Section 3.4, Common Diagnostic and Pass/Fail LED Status Sequences. **NOTE**: This LED does not blink.

Button/LED	Action
Diagnostic LED	• **Off**: No data. • **Green**: Valid data. • **Blue**: Format error. • **Red**: CRC error. • **Violet**: Random bytes. **LED Error Display Behaviour:** • Errors (Blue, Red, Violet) show for 5 seconds, then the LED returns to Green if no new errors occur. • The LED updates instantly when a new error occurs. **NOTE**: See Section 3.4, Common Diagnostic and Pass/Fail LED Status Sequences. **NOTE**: This LED is always on when receiving data. It does not blink. **NOTE**: LED shows the status of the last 5 seconds of J2799 data.

3.2 CHANGING THE BATTERIES

Table 3-2 describes the DNR battery replacement steps, while Figure 3-3 shows the location of batteries and related components.

TABLE 3-2: STEPS TO CHANGING BATTERIES

	Action
STEP 1	**Remove** the back cover screws with a **2.5 mm hex key** (see **Figure 3-4**).
STEP 2	**Lift** off the cover. **Note locations of rubber gasket** and **foam pad** (**Figure 3-3**).
STEP 3	**Remove** the **retaining clip** and old batteries (see **Figure 3-3**).
STEP 4	**Insert** new batteries with correct polarity (see **Figure 3-3**): • **Battery #1:** Positive (+) to the non-spring end • **Battery #2:** Negative (–) to the spring end **CAUTION**: Make sure the battery's polarity markings match the circuit board's polarity markings.
STEP 5	**Reinstall** the **retaining clip**.
STEP 6	**Attach** the **back cover** and **tighten screws** with the hex key (see **Figure 3-4**).
STEP 7	**Power** on the DNR and confirm the Power LED turns on.

WARNING: The DNR device requires two **specific 3.6V lithium batteries**.

Only buy DNR batteries from the following two suppliers:

- **Eve Batteries ER1405** – at https://www.evemall.eu/
- **SAFT LS14500** – Available on Amazon.com

Other batteries may cause malfunction, fire, or explosion.

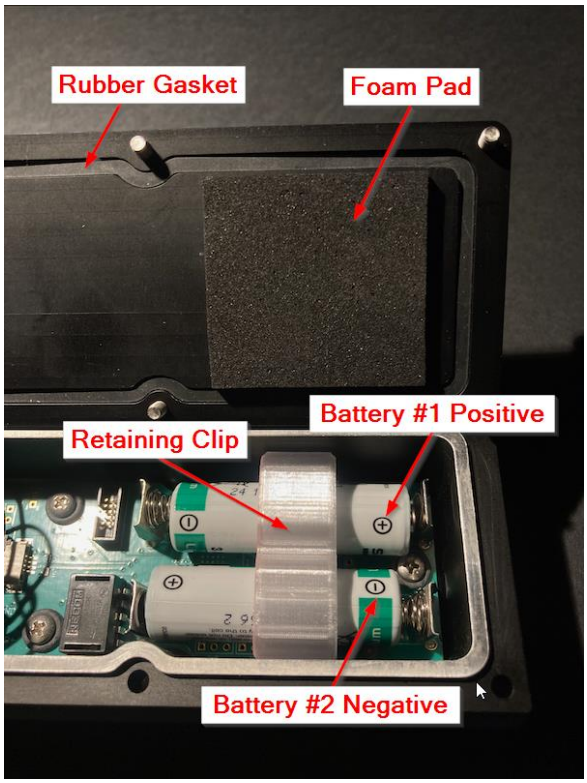

FIGURE 3-3 DNR BATTERY REPLACEMENT

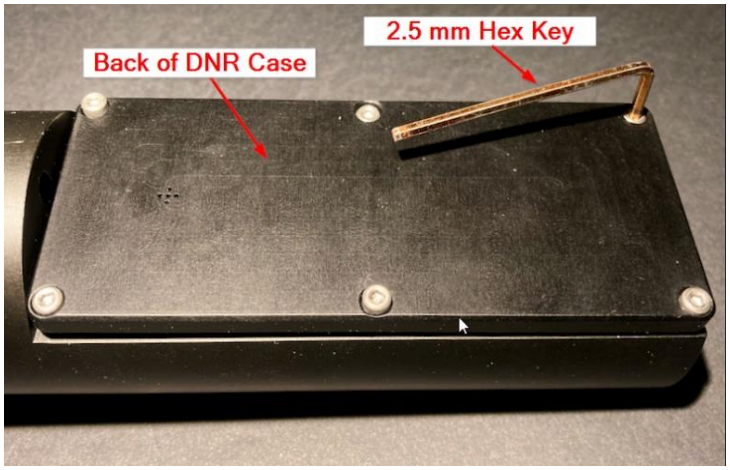

FIGURE 3-4 DNR BACK COVER

3.3 DNR BASIC OPERATION

Table 3-3-1 details the steps to operate the DNR.

TABLE 3-3-1: DNR BASIC OPERATION STEPS

	Action
STEP 1	**Power on the DNR**. Press and hold the Power button until the Power LED turns on. **Notes:** • **Auto Power-Off**: The DNR powers off after 5 minutes of inactivity. • **Low Battery Mode**: The Power LED will blink slowly but the DNR continues to work. • **Dead Battery**: The Power LED will blink fast for 10 seconds then the DNR powers off.
STEP 2	**Insert the DNR** into the hydrogen vehicle fuelling port (see **Figure 3.5**).
STEP 3	**Observe the LED status indicators.** - **See Table 3-1 for a description of LED** colours and states.
STEP 4	**Power off the DNR**. Press and hold the power button until the Power LED turns off.

FIGURE 3-5 DNR ATTACHED TO HYDROGEN VEHICLE FUELLING PORT

3.4 COMMON DIAGNOSTIC AND PASS/FAIL LED STATUS SEQUENCES

The figures below show LED states for Valid, Format Error, CRC Error, and Random Byte Error J2799 messages. Tables detail time events as the DNR receives messages from the fuelling port.

3.4.1 Valid J2799 Message Sequence

Figure 3-6 illustrates Pass/Fail and Diagnostic LED states, while Table 3-4-1 details each step for valid J2799 messages.

TABLE 3-4-1: VALID J2799 MESSAGE SEQUENCE

Time	Valid J2799 Message Sequence Received by DNR
t0	**No data received**: **Pass/Fail** and **Diagnostic LEDs** are both unlit.
t1 – t2	**Valid Data: Pass/Fail and Diagnostic LEDs both turn green** while receiving valid J2799 messages (see **Figure 3-6**).
t3	**End of Data: Pass/Fail LED turns yellow, signalling Data disconnect** five seconds after the last valid message.
t4	**DNR Inactive**: **Pass/Fail LED turns off** five seconds after the disconnect.

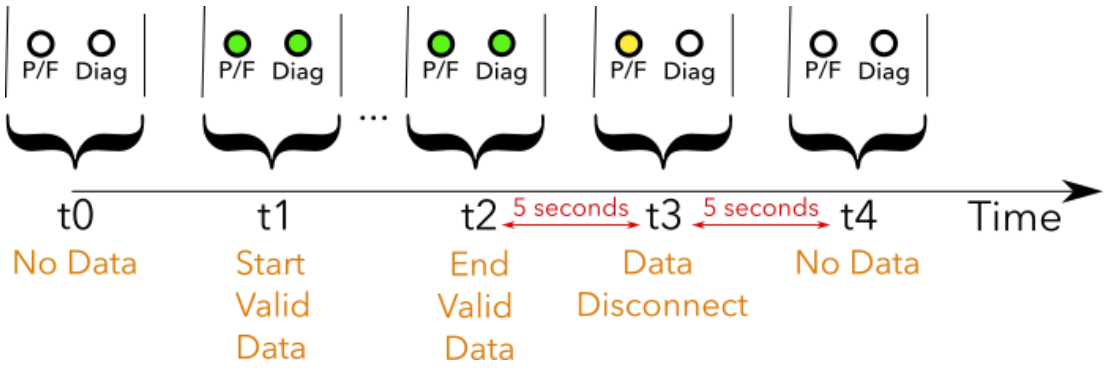

FIGURE 3-6 PASS/FAIL & DIAGNOSTIC LEDS – VALID MESSAGE SEQUENCE

3.4.2 J2799 Format, CRC, and Random Bytes Error Message Sequences

The following figures show the Pass/Fail and Diagnostic LED states when a J2799 format error (Figure 3-7), a CRC error (Figure 3-8), or random bytes (Figure 3-9) are detected. Table 3-4-2 details each step for these errors.

Note: The Diagnostic LED instantly updates to reflect the latest J2799 error, overwriting the previous state in real time.

TABLE 3-4-2: J2799 ERROR MESSAGE SEQUENCES

Time	Valid J2799 Message Sequence Received by DNR
t0	**No data received**: **Pass/Fail** and **Diagnostic LEDs** are both unlit.
t1 – t2	**Valid Data: Pass/Fail and Diagnostic LEDs both turn green** while receiving valid J2799 messages**.**
t2	**Format Error: Pass/Fail LED turns red, and Diagnostic LED turns blue** when receiving improperly formatted J2799 messages (see **Figure 3-7**).
or t2	**CRC Error: Pass/Fail and Diagnostic LEDs both turn red** when receiving J2799 messages **containing CRC errors** (see **Figure 3-8**).
or t2	**Random Bytes: Pass/Fail LED turns violet and Diagnostic LED turns red** when receiving J2799 messages **containing Random Byte errors** (see **Figure 3-9**).
t3	**End of Data: Pass/Fail LED turns yellow, signalling Data disconnect** five seconds after the last received message.
t4	**DNR Inactive**: **Pass/Fail LED turns off** five seconds after the disconnect.

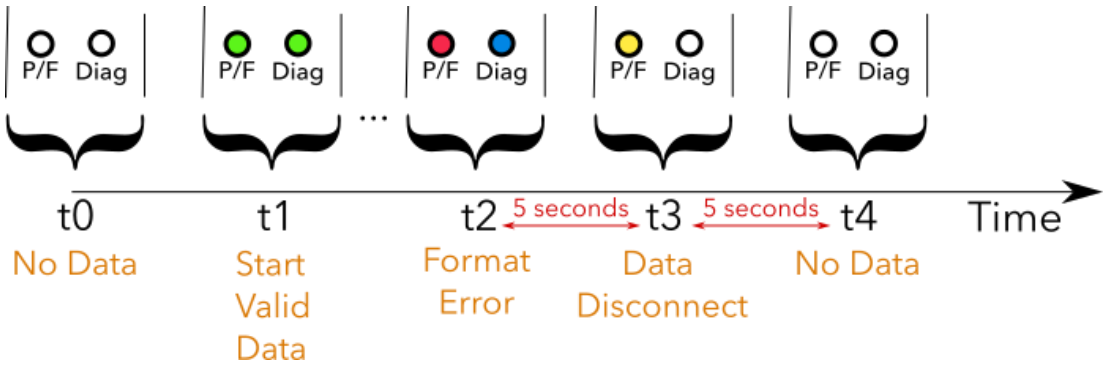

FIGURE 3-7 PASS/FAIL & DIAGNOSTIC LEDS – FORMAT ERROR MESSAGE SEQUENCE

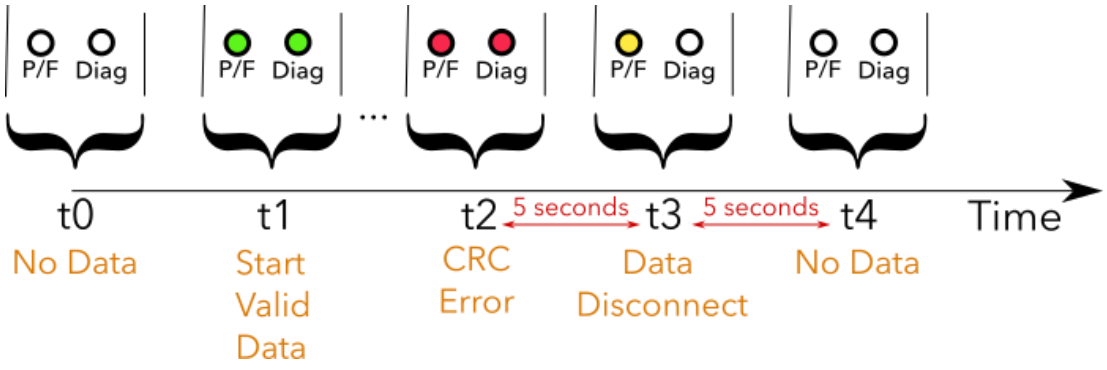

FIGURE 3-8 PASS/FAIL & DIAGNOSTIC LEDS – CRC ERROR MESSAGE SEQUENCE

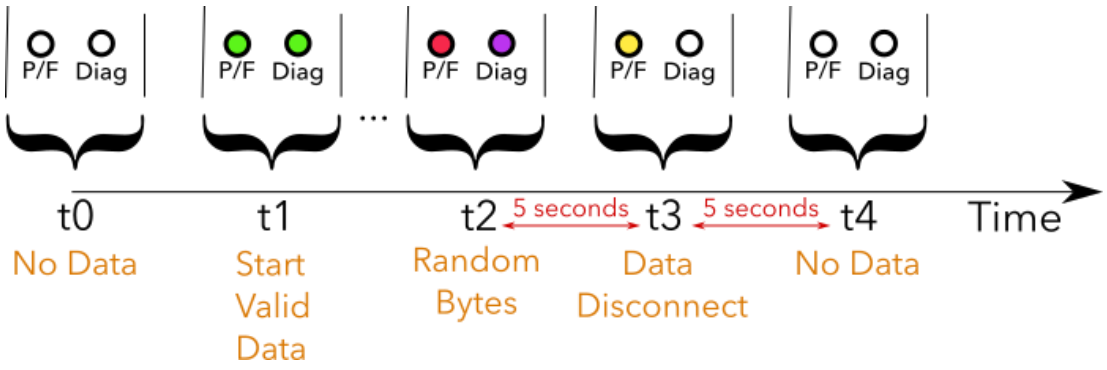

FIGURE 3-9: PASS/FAIL & DIAGNOSTIC LEDS – RANDOM BYTES ERROR MESSAGE SEQUENCE

4 VIEW DNR MESSAGES USING WIRELESS DATA TRANSMISSION

Remotely view DNR-received J2799 messages and DNR diagnostic information on a laptop with a wireless connection to the DNR (see **Figure 4**).

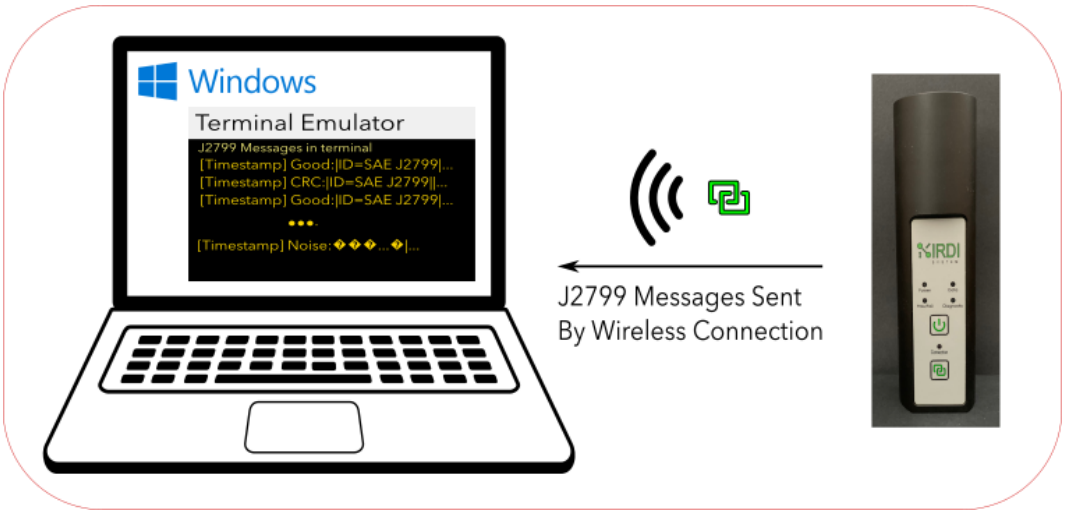

FIGURE 4: VIEW J2799 MESSAGES FROM HYDROGEN VEHICLE AND DNR DIAGNOSTICS ON LAPTOP

Overview of steps required to view the messages from the DNR:

1. Enable wireless mode on the DNR.
2. Connect the DNR to the laptop using a wireless connection.
3. Start a terminal emulator and connect it with the DNR.
4. Analyze J2799 messages and DNR diagnostic information using the terminal emulator.

4.1 ESTABLISH WIRELESS CONNECTION WITH DNR

TABLE 4-1: STEPS TO VIEW J2799 MESSAGES IN WINDOWS

	Action
STEP 1	**Press and hold** the DNR **Power Button** until the **Power LED turns on**.
STEP 2	**Press and hold** the **Connection button** until the **Connection LED blinks** (see **Figure 4-1-1**). The wireless connection mode is now enabled and the DNR is searching for a laptop. **Notes:** • **Solid blue Connection LED**: DNR is connected to the laptop. • **If not connected after one minute**, the Wireless Connection mode ends, and the Connection LED stops blinking. • **The DNR powers off after 5 minutes of inactivity** (i.e., no messages received) even in Wireless Connection mode.

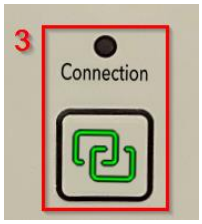

FIGURE 4-1-1 DNR WIRELESS CONNECTION BUTTON AND LED

Action	
STEP 3	**Open the Windows BT & other devices** settings page (see **Figure 4-1-2**).

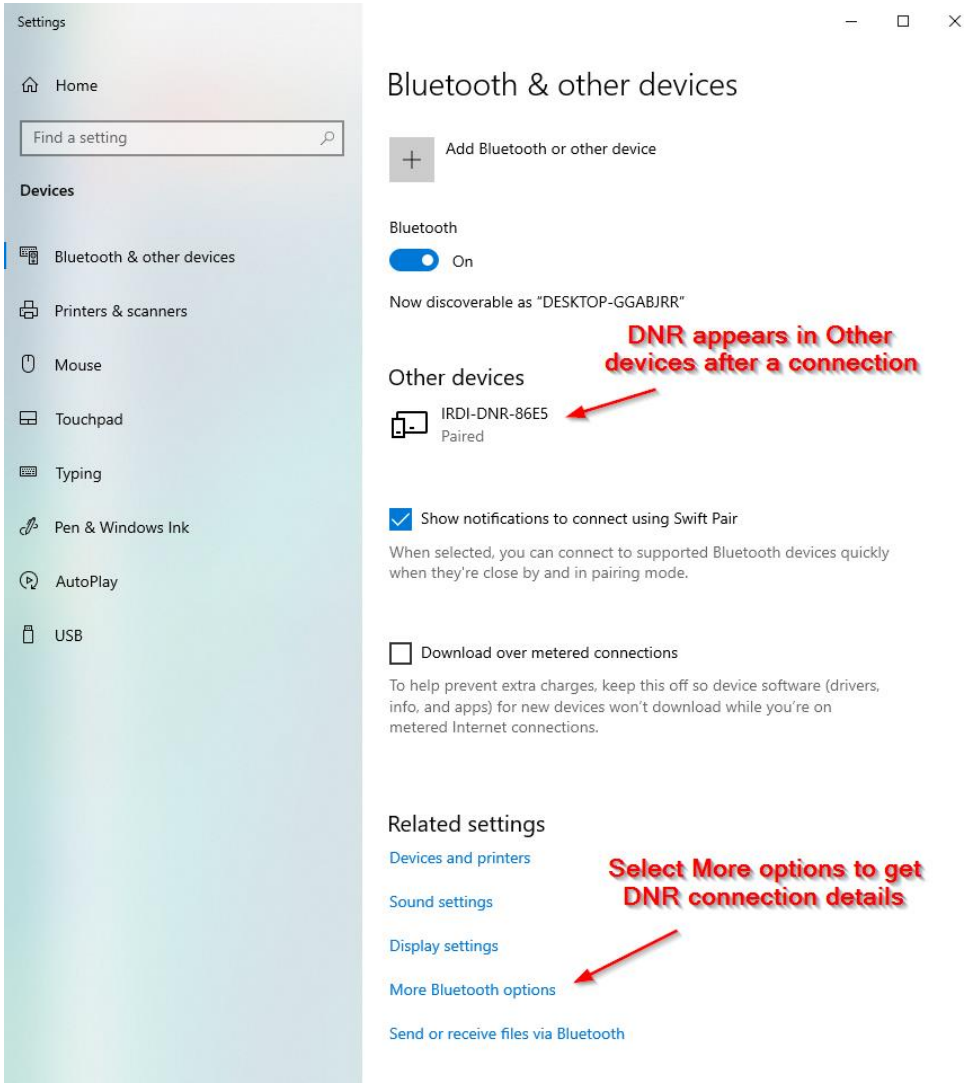

FIGURE 4-1-2 WINDOWS 10 BT & OTHER DEVICES SETTINGS PAGE

	Action
STEP 4	In the main BT settings page, **set** the **BT devices discovery** setting to **Advanced** (see **Figure 4-1-3**). **Note: This step is for Windows 11 only.**

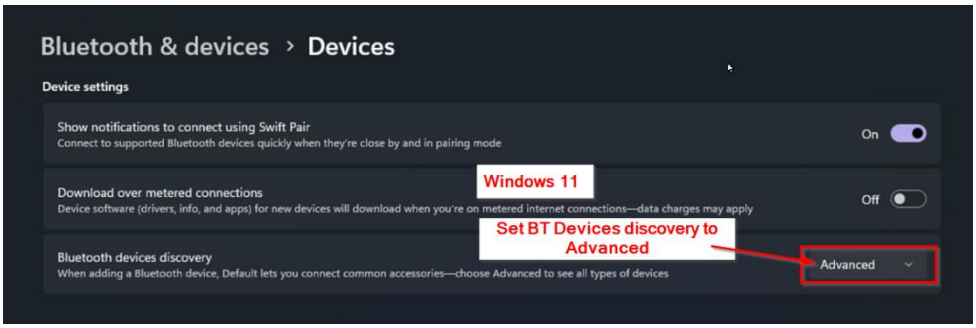

FIGURE 4-1-3 WINDOWS BT & DEVICES DISCOVERY ADVANCED

	Action
STEP 5	**Select Add Device** from BT & devices > Devices (see **Figure 4-1-4**).

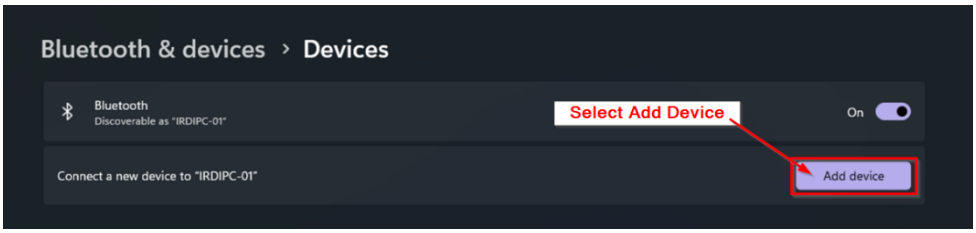

FIGURE 4-1-4 WINDOWS BT & DEVICES ADD DEVICE

	Action
STEP 6	**Select BT** from the **Add a device** dialog (see **Figure 4-1-5**).

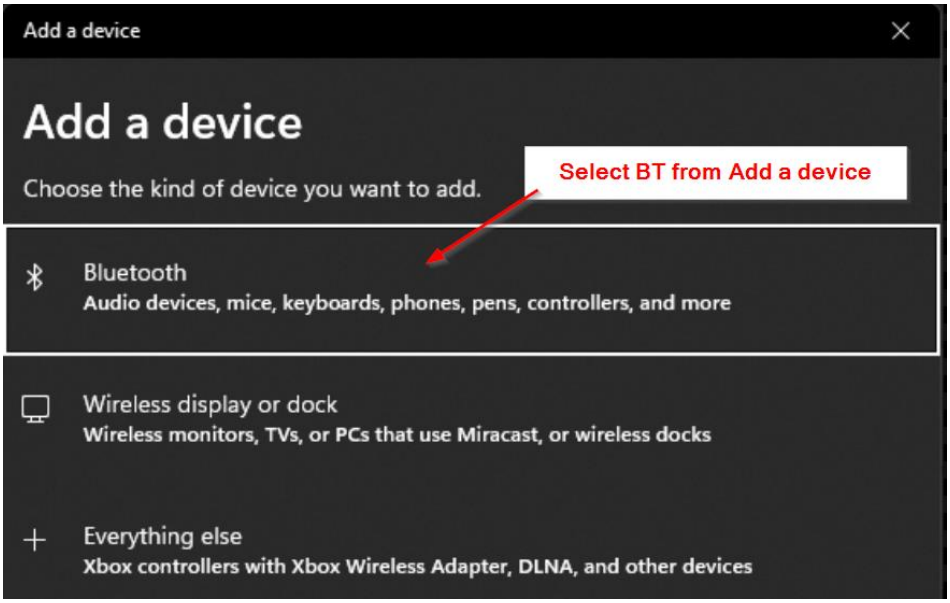

FIGURE 4-1-5 WINDOWS BT & DEVICES ADD A DEVICE

	Action
STEP 7	**Verify that the DNR appears in the "Other Devices" section from STEP 3** (see **Figure 4-1-6**). **NOTE:** The format of a DNR device wireless ID is IRDI-DNR-####

FIGURE 4-1-6 DNR IN LIST OF OTHER DEVICES AFTER CONNECTION

	Action
STEP 8	**Check the DNR-assigned COM ports**. You can find these in **More BT Settings** (Windows 10) (see **Figure 4-1-7**) or **More BT options (**Windows 11), under the COM Ports tab. **NOTES:** • Two COM ports will be assigned to the DNR. • One port is incoming, and the other port is outgoing. • Use the **Outgoing COM#, IRDI-DNR_### 'Serial Port,'** i.e., COM4, to connect to the DNR.

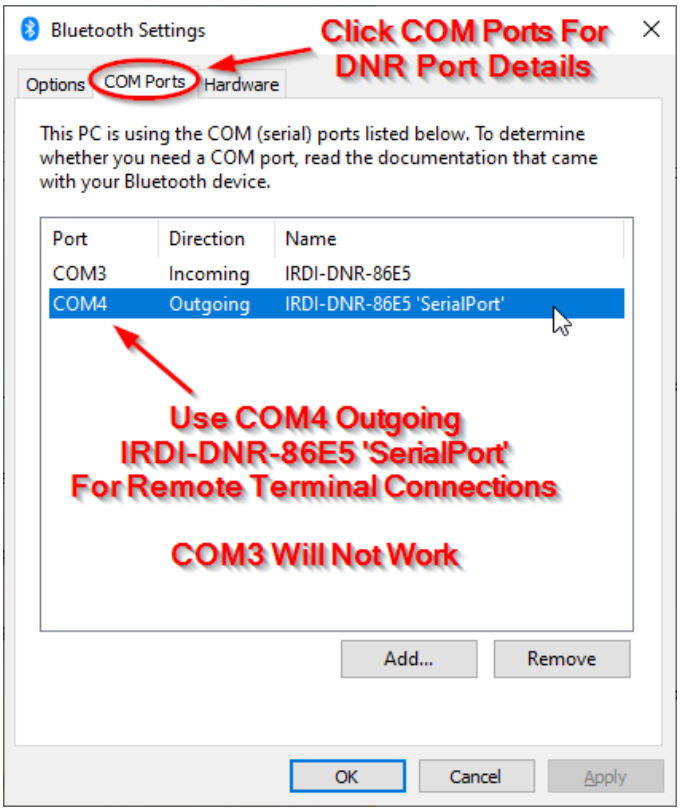

FIGURE 4-1-7 DNR-ASSIGNED COM PORTS

Action	
STEP 9	**Connect to the DNR using a terminal emulator** using the outgoing COM port. These steps are shown in Section 4.2, Start a Terminal Emulator, below.

4.2 START A TERMINAL EMULATOR

A **terminal emulator** provides a real-time view of J2799 messages received and evaluated by the DNR from the hydrogen vehicle's fuelling port, along with the diagnostic data the DNR generates. The emulator does not process or alter the data—it only displays it for monitoring.

- Helps you monitor, analyze, and troubleshoot vehicle J2799 messages in real-time.

4.2.1 Choose Software (Tera Term, RealTerm, etc.)

Use a terminal emulator to connect to the DNR. Two terminal programs are:

- **Tera Term**—User-friendly and widely used.
  - https://teratermproject.github.io/
- **Real Term**—Advanced features for debugging.
  - https://realterm.sourceforge.io/

This user manual uses **Tera Term**, but the steps apply to most terminal programs, even if the interfaces differ.

4.2.2 Establish a Serial Connection

TABLE 4-2-2: STEPS TO ESTABLISH A SERIAL CONNECTION IN TERA TERM

	Action
STEP 1	**Open Tera Term** on your computer. A **New Connection dialog box** will appear (see **Figure 4-2-2-1**).

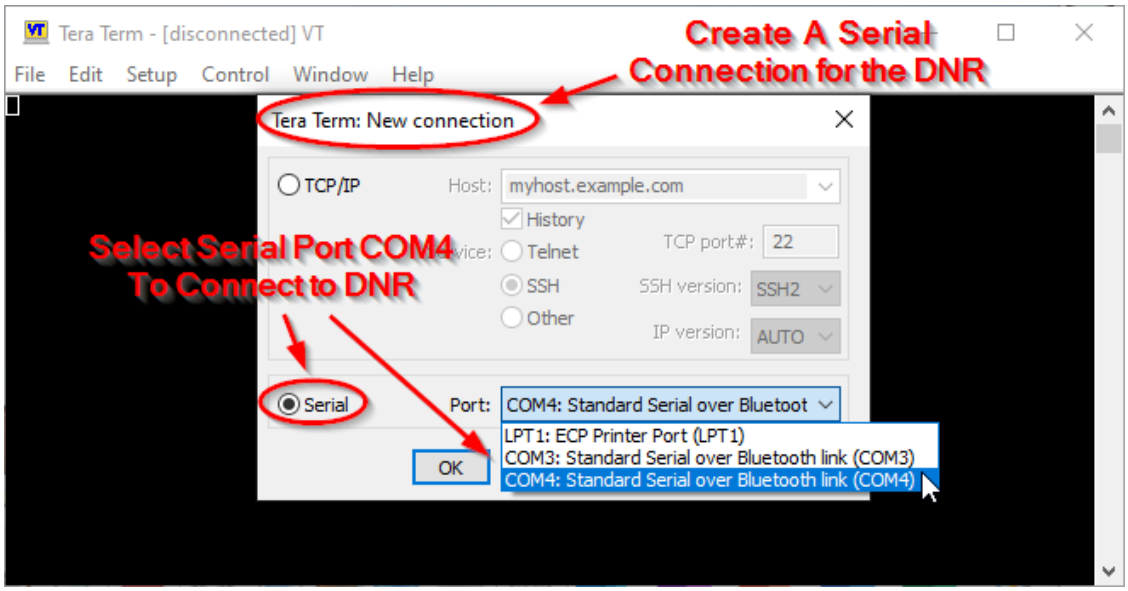

FIGURE 4-2-2-1 TERA TERM NEW CONNECTION DIALOG

	Action
STEP 2	**Select the Serial option** for connection type (see **Figure 4-2-2-1** above).
STEP 3	**Click the Port dropdown** menu and **choose** the outgoing DNR COM port, e.g., *COM4: Standard Serial over BT link (COM4)* (see **Figure 4-2-2-1**). **Note:** • FIGURE 4-1-7 shows all the DNR-ASSIGNED COM PORTS. • Try the other DNR-assigned COM port if no data appears in the terminal window.
STEP 4	**Click OK to establish the wireless connection with the DNR** (see **Figure 4-2-2-1** above).

Action	
STEP 5	**Check that the DNR Connection LED is solid blue (i.e. not blinking),** indicating a successful connection.

Once connected, the terminal emulator begins displaying real-time messages from the DNR, which you can monitor and analyze in Tera Term. The baud rate setting does not affect DNR data streaming. Figure 4-2-2-2 shows the terminal emulator in a waiting state, ready to receive messages from the DNR.

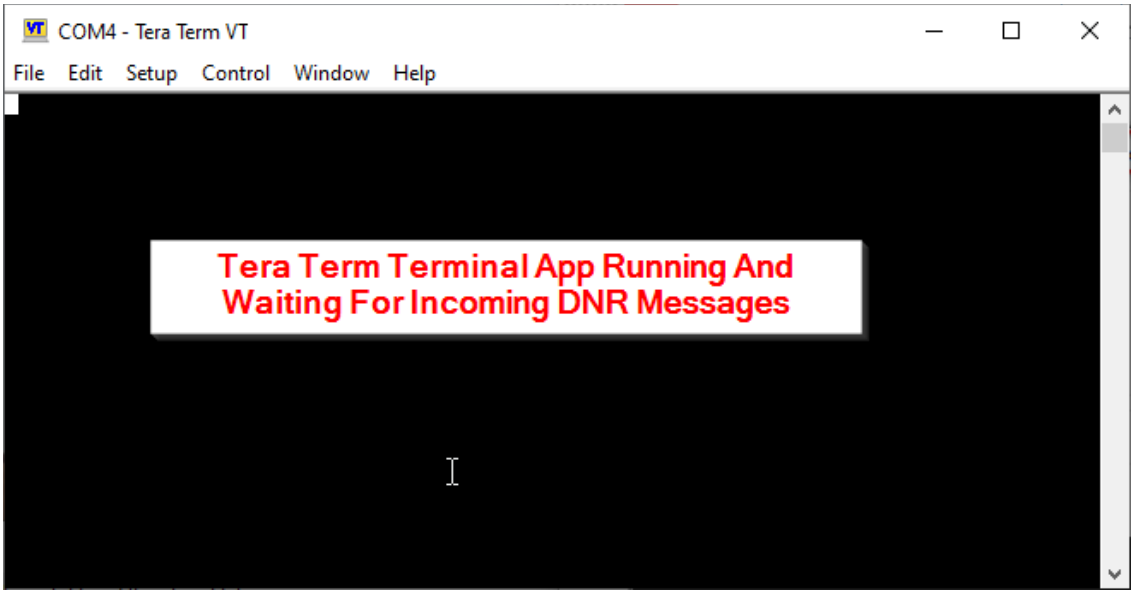

FIGURE 4-2-2-2 TERA TERM WAITING FOR DNR MESSAGES

4.3 ANALYZE DNR MESSAGES IN THE TERMINAL EMULATOR

Tera Term displays real-time **J2799 messages** received by the DNR from the hydrogen vehicle fuelling port (see **Figure 4-3**). Each line represents a separate message.

- **Live Data**—Messages update continuously as they arrive.
- **Message Types**—Messages can be **valid** or **corrupted**.
- These message types are discussed in section 4.3.1.

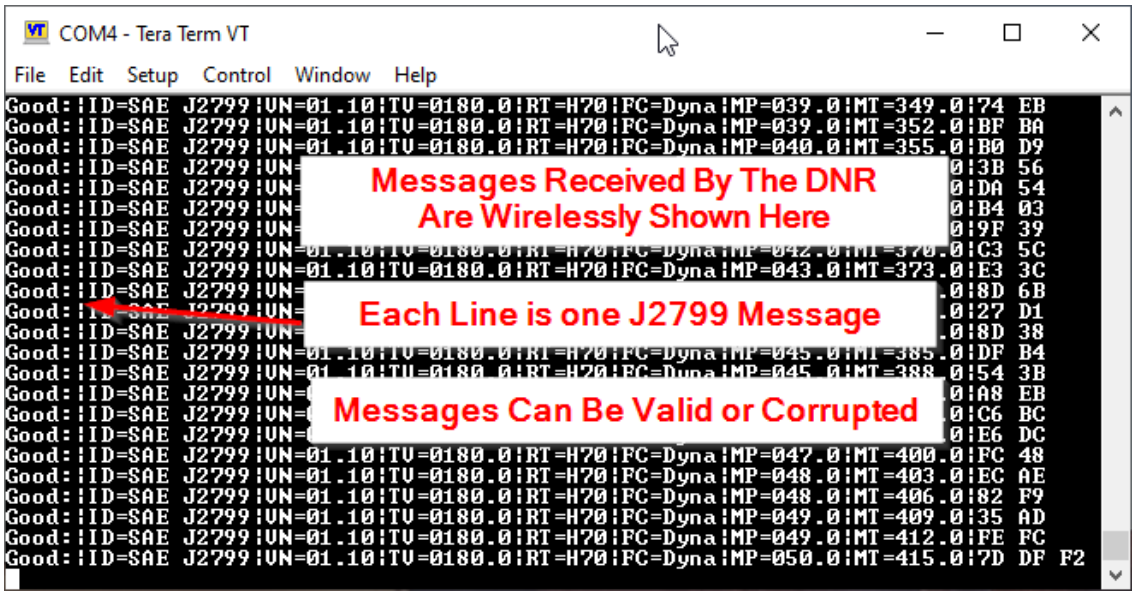

FIGURE 4-3 TERA TERM DISPLAY OF DNR-RECEIVED MESSAGES

4.3.1 Matching Terminal Messages with DNR LED Statuses

The **DNR Diagnostic and Pass/Fail LEDs** (see **Figure 4-3-1**) continuously change colour to indicate the validity of incoming J2799 messages. Examples of messages with corresponding LED states are shown below.

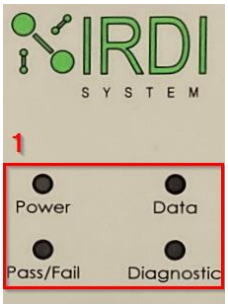

FIGURE 4-3-1 DNR J2799 LED MESSAGE STATUS INDICATORS

4.3.1.1 Valid J2799 Message in Terminal Emulator and DNR LED States

Table 4-3-1-1 shows a **valid J2799 message** with its **Diagnostic** and **Pass/Fail LED** statuses.

TABLE 4-3-1-1: VALID J2799 MESSAGE AND ITS LED STATUSES

Message LED Status		
LED	**Status**	**Description**
Diagnostic	**Green**	**Valid Data.**
Pass/Fail	**Green**	**Valid Pattern. Indicates no errors in the past 5 seconds of J2799 transmission.**
Example of a valid J2799 message shown in the terminal emulator:		
`[2025-02-09 23:44:31.688] Good:|ID=SAE J2799|VN=02.00|TV=0180.0|RT=H70|FC=Halt|MP=064.0|MT=280.0|OD=good|87 4E`		

4.3.1.2 Format Error J2799 Message in Terminal Emulator and DNR LED States

A **format error** occurs when the DNR detects an invalid **J2799 message structure**. The **Diagnostic LED turns** 🔵 **Blue** for format errors.

Table 4-3-1-2 shows **J2799 messages** with format errors and their **Diagnostic** and **Pass/Fail LED** statuses.

TABLE 4-3-1-2: FORMAT ERROR MESSAGE AND LED STATUSES

Message LED Status		
LED	**Status**	**Description**
Diagnostic	🔵 **Blue**	**Format Error**. The incoming message is incorrectly formatted.
Pass/Fail	🔴 **Red**	**Invalid Pattern. It indicates that there has been a J2799 error within the last 5 seconds of transmission.**
Invalid format J2799 message examples (3) shown in the terminal emulator:		
`[2025-02-09 23:44:55.079] ID:|ID=SAE J2779|VN=02.00|TV=0180.0|RT=H70|FC=Halt|MP=064.0|MT=280.0|58 5E`		
`[2025-02-09 23:44:41.059] INC:|ID=SAE J2799|VN=02.00|TV=0180.0|RT=H70|FC=Halt|MP=064.0|MT=280.0|OD=good|87 4E`		
`[2025-02-09 23:44:56.065] RT:|ID=SAE J2799|VN=02.00|TV=0180.0|RT=H90|FC=Halt|MP=064.0|MT=280.0|55 B7`		

4.3.1.3 CRC Error J2799 Message in Terminal Emulator and DNR LED States

A **CRC (Cyclic Redundancy Check) error** occurs when the DNR detects **corrupted data** in a **J2799 message**. The **Diagnostic LED turns** 🔴 **red** for CRC errors.

Table 4-3-1-3 shows an in**valid J2799 message** with a **CRC error** and its **Diagnostic** and **Pass/Fail LED** statuses.

TABLE 4-3-1-3: CRC ERROR MESSAGE AND LED STATUSES

Message LED Status		
LED	**Status**	**Description**
Diagnostic	🔴 **Red**	**CRC (Cyclic Redundancy Check) Error**. The incoming message contains a CRC error.
Pass/Fail	🔴 **Red**	**Invalid Pattern. It indicates that there has been a J2799 error within the last 5 seconds of transmission.**
Example of an invalid CRC J2799 message shown in the terminal emulator:		
`[2025-02-09 23:44:30.785] CRC:|ID=SAE J2799|VN=02.00|TV=0180.0|RT=H70|FC=Halt|MP=064.0|MT=280.0|87 4E`		

4.3.1.4 Random Bytes Error J2799 Message in Terminal Emulator and DNR LED States

A **Random Bytes error** occurs when the DNR detects unexpected or **corrupt data** within a **J2799 message**. The **Diagnostic LED turns** 🟣 **Violet** for this error.

Table 4-3-1-4 provides an example of a Random Bytes error message and its corresponding LED statuses.

TABLE 4-3-1-4: RANDOM BYTES ERROR MESSAGE AND LED STATUSES

Message LED Status		
LED	**Status**	**Description**
Diagnostic	🟣 Violet	**Random Bytes error.** The incoming message contains random bytes.
Pass/Fail	🔴 **Red**	**Invalid Pattern. It indicates that there has been a J2799 error within the last 5 seconds of transmission.**
Example of invalid random bytes J2799 message shown in the terminal emulator:		
`[2025-02-09 23:44:41.561] Noise:`		

5 TROUBLESHOOTING

Follow these steps to find and fix common DNR problems.

5.1 PROBLEM: POWER LED WON'T TURN ON

POSSIBLE ROOT CAUSE #1	
Low battery power—The DNR cannot power up.	
TROUBLESHOOTING STEPS	
1. Replace the batteries (see **Section 3.2**).	

5.2 PROBLEM: INFRARED DATA NOT RECEIVED

The **Power** LED is on, but the Data LED is not blinking, indicating that no infrared data is being received, even though the hydrogen vehicle is transmitting.

POSSIBLE ROOT CAUSE #1	
Low battery power.	
TROUBLESHOOTING STEPS	
1. Check the **Power LED**. 2. If it is **blinking**, replace the batteries (see **Section 3.2**).	
POSSIBLE ROOT CAUSE #2	
The DNR does not detect any data.	
TROUBLESHOOTING STEPS	
1. Make sure the DNR is properly inserted into the **fuelling port**.	
2. **Check** that both the DNR and fuelling port surfaces are **clean** and not obstructed.	
POSSIBLE ROOT CAUSE #3	
Infrared interference from smartphones or other devices.	
TROUBLESHOOTING STEPS	
1. Move the DNR away from smartphones and other infrared-emitting devices.	
2. Try using the DNR in a location with minimal infrared interference.	
3. If the issue persists, restart the DNR and repeat the setup steps.	

5.3 TROUBLESHOOTING WIRELESS CONNECTION ISSUES

5.3.1 Problem: DNR Not Appearing in Windows Device List

If the DNR does not appear under **BT & other devices**, follow these steps:

POSSIBLE ROOT CAUSE #1	
DNR is off or in sleep mode.	
TROUBLESHOOTING STEPS	
1. **Press and hold** the **Power Button** until the **Power LED** turns on.	
2. **Press and hold** the **Connection Button** until the **Connection LED** blinks.	
POSSIBLE ROOT CAUSE #2	
DNR is already connected to another device.	
TROUBLESHOOTING STEPS	
1. **Check** if the **Connection LED** is solid (indicating an active connection).	
2. **Unpair** the DNR from other devices and try pairing again.	
3. **Press and hold** the **Connection Button** until the **Connection LED** blinks to force connection mode.	
POSSIBLE ROOT CAUSE #3	
Windows BT is not configured correctly.	
TROUBLESHOOTING STEPS	
1. Open **Settings** → **BT & devices** and make sure **BT is ON**.	
2. Click **Add Device** → **BT** and search for **IRDI-DNR-XXXX**.	
3. If the device does not appear, turn **BT OFF** and **ON** and try again.	
POSSIBLE ROOT CAUSE #4	
Windows BT driver issues.	
TROUBLESHOOTING STEPS	
1. Open the **Device Manager** (press **Win + X** and then select **Device Manager**).	
2. Expand **BT**, right-click the adapter, and select **Update driver** → **Search automatically**.	

5.3.2 Problem: Connection Fails During Pairing

If the DNR does not pair with Windows, follow these steps:

POSSIBLE ROOT CAUSE #1	
Interference or range issues.	
TROUBLESHOOTING STEPS	
1. Move the DNR **closer to the computer**.	
2. Turn off **other BT devices** that could cause interference.	
3. Avoid pairing near strong wireless signals (e.g., Wi-Fi routers, microwaves).	

5.3.3 Problem: Terminal Emulator Not Receiving Data

If the terminal emulator (e.g., TeraTerm, RealTerm) does not receive data from the DNR, follow these steps:

POSSIBLE ROOT CAUSE #1	
DNR not connected.	
TROUBLESHOOTING STEPS	
1. **Check** Windows Settings → Go to **BT & devices** and look for a device named **"IRDI-DNR-XXXX"**	
2. **If the DNR is missing, reconnect it** (see **Section 5.3.1** and **Section 5.3.2**).	
POSSIBLE ROOT CAUSE #2	
Incorrect COM port selected.	
TROUBLESHOOTING STEPS	
1. **Open Windows Device Manager → and navigate to Ports (COM & LPT)**.	
2. **Identify the two COM ports listed under IRDI-DNR-XXXX** and select the outgoing COM port.	
3. In the terminal emulator, select **Serial Port—DNR Outgoing COM PORT**.	
4. If there is still no data being received, try using the other COM port.	
POSSIBLE ROOT CAUSE #3	
Lost connection.	
TROUBLESHOOTING STEPS	
1. Reconnect the DNR to the laptop.	

POSSIBLE ROOT CAUSE #4	
DNR inactivity timeout. The DNR automatically shuts down after 5 minutes of inactivity.	
TROUBLESHOOTING STEPS	
1. **Press and hold the Power Button** until the **Power LED** turns on.	
2. **Press and hold the Connection Button** until the **Connection LED** blinks.	
3. **Reconnect the DNR** to your laptop.	

6 APPENDIX A: COUNTRY SPECIFIC BT DISCLOSURES

This section lists required country-specific regulatory approval notices for the Microchip RN4678 BT module.

6.1 UNITED STATES

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FIGURE 6-1 UNITED STATES

6.2 CANADA

This device contains license-exempt transmitter(s)/ receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference;
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FIGURE 6-2A CANADA

This radio transmitter [IC: 12246A-BM78SPPS5M2] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Le présent émetteur radio [IC: 12246A-BM78SPPS5M2] a été approuvé par Innovation, Sciences et Développement économique Canadapour fonctionner avec les types d'antenne énumérés cidessous et ayant un gain admissible maximal Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

FIGURE 6-2B CANADA

6.3 TAIWAN

注意！

依據 低功率電波輻射性電機管理辦法

第十二條 經型式認證合格之低功率射頻電機，非經許可，

公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計

之特性及功能。

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；

經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信規定作業之無線電信。

低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性

電機設備之干擾。

FIGURE 6-3 TAIWAN