Test TX Free Software User Manual
Document 200802

Approval

Revision	Name	Title	Signature
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DEFINITIONS AND ABBREVIATIONS

The following terms and/or abbreviations are used in this manual:

Term	Definition
IRDI	Infrared Data Interface – communications interface which uses infrared technology to transmit data.

APPLICABLE DOCUMENTS

The following documents are recommended as reference material.

Document Reference	Document Title	Document Number
[1]	Hydrogen Surface Vehicle to Station Communications Hardware and Software	J2799_202406

1 SCOPE

This user manual provides detailed instructions on setting up and using the **IRDI infrared (IR) data transmitter**. This manual also includes a troubleshooting section.

2 INTRODUCTION

The **IRDI J2799 standard** is a method of communicating information such as tank pressure and tank temperature from a hydrogen-powered vehicle to a hydrogen fueling station, during a fueling operation. This communication is used to ensure that the hydrogen fueling is conducted in a controlled and safe manner. The IRDI standard uses IR as the physical communication method.

The IR data transmitter and the test transmitter software can be used together to do the following:

- Send test messages via IR to a receiver (computer or hydrogen station);

For the free test transmitter software, test messages are predefined and cannot be changed. The software is installed on a computer, and the IR data transmitter is plugged into one of the computer's USB ports.

3 REQUIREMENTS

This section provides the list of equipment needed.

TABLE 1: REQUIRED EQUIPMENT

Qty	Part #	Description
1	n/a	Desktop or laptop computer, Windows 7 or higher
1	200410	IRDI IR Data Transmitter with USB
1	200676	IRDI Test TX Free Software

4 GETTING STARTED

This section explains how to set up the equipment.

4.1 SETTING UP THE HARDWARE

Figure 4-1 shows the hardware setup, consisting of an IR data transmitter with a USB cable, and a computer.

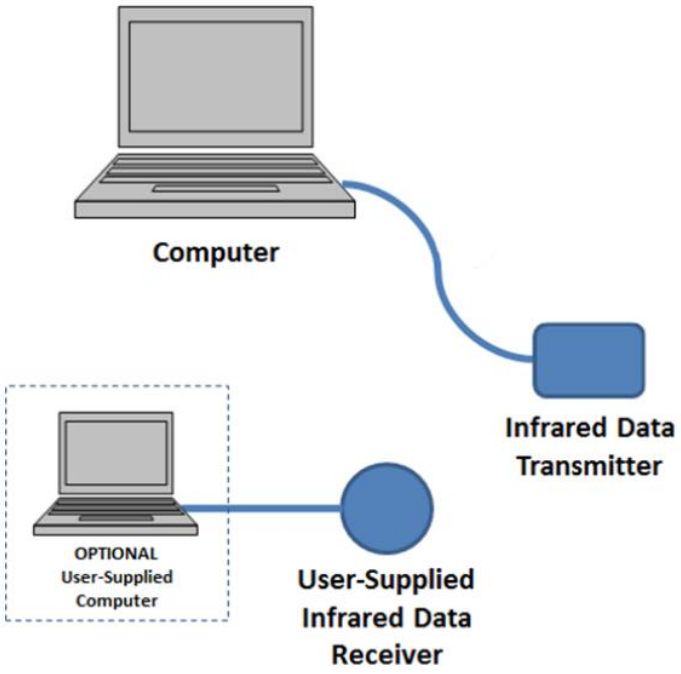

FIGURE 4-1: REQUIRED HARDWARE

The user supplies the DC or AC power input, IR data receiver and any other computer equipment used to read the messages at the receiver.

Figure 4-2 shows the IR data transmitter with USB cable.

FIGURE 4-2: IR DATA TRANSMITTER WITH USB CABLE

4.1.1 Installing the IR Data Transmitter

To set up IR data transmitter hardware, be sure that you are connected to the internet, then follow the steps below.

	Action
STEP 1	Insert the IR data transmitter's USB plug into an available USB port on the computer - see Figure 4-1.
STEP 2	Depending on your PC settings, the USB drivers may install automatically from Windows Update – Note that you must be connected to the Internet.
STEP 3	Device may appear in Device Manager with a yellow exclamation mark. If this happens, open Device Manager - see Figure 4-3 to verify - see Figure 4-4. Initiate the USB driver installation by right-clicking the USB device and selecting "> Update Drivers > Automatic? (Search Windows Update)". Note: Port Number

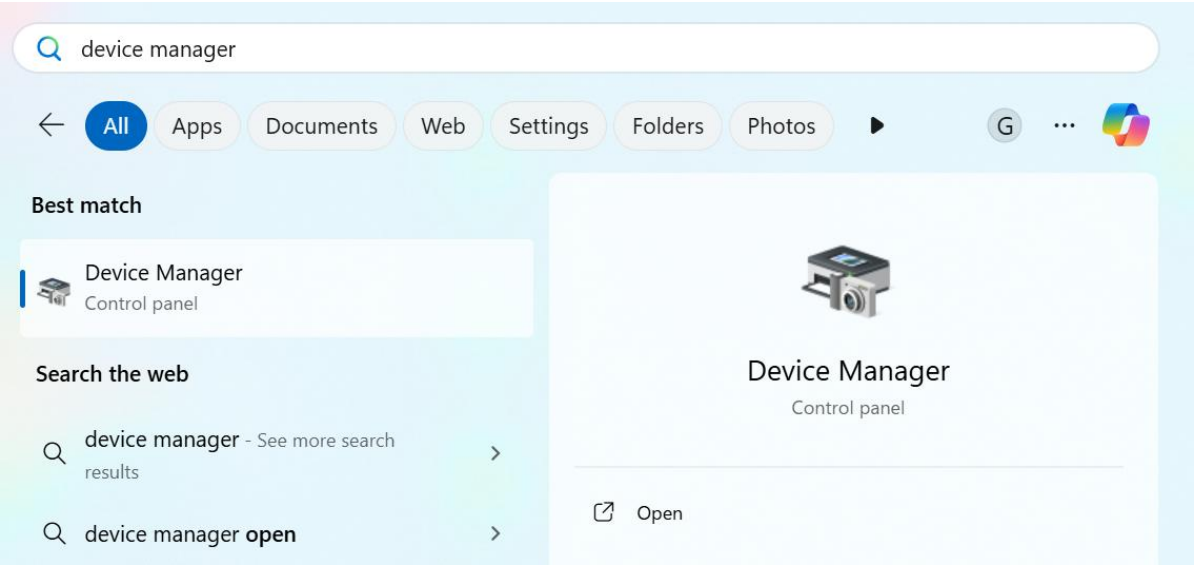

FIGURE 4-3: OPEN DEVICE MANAGER

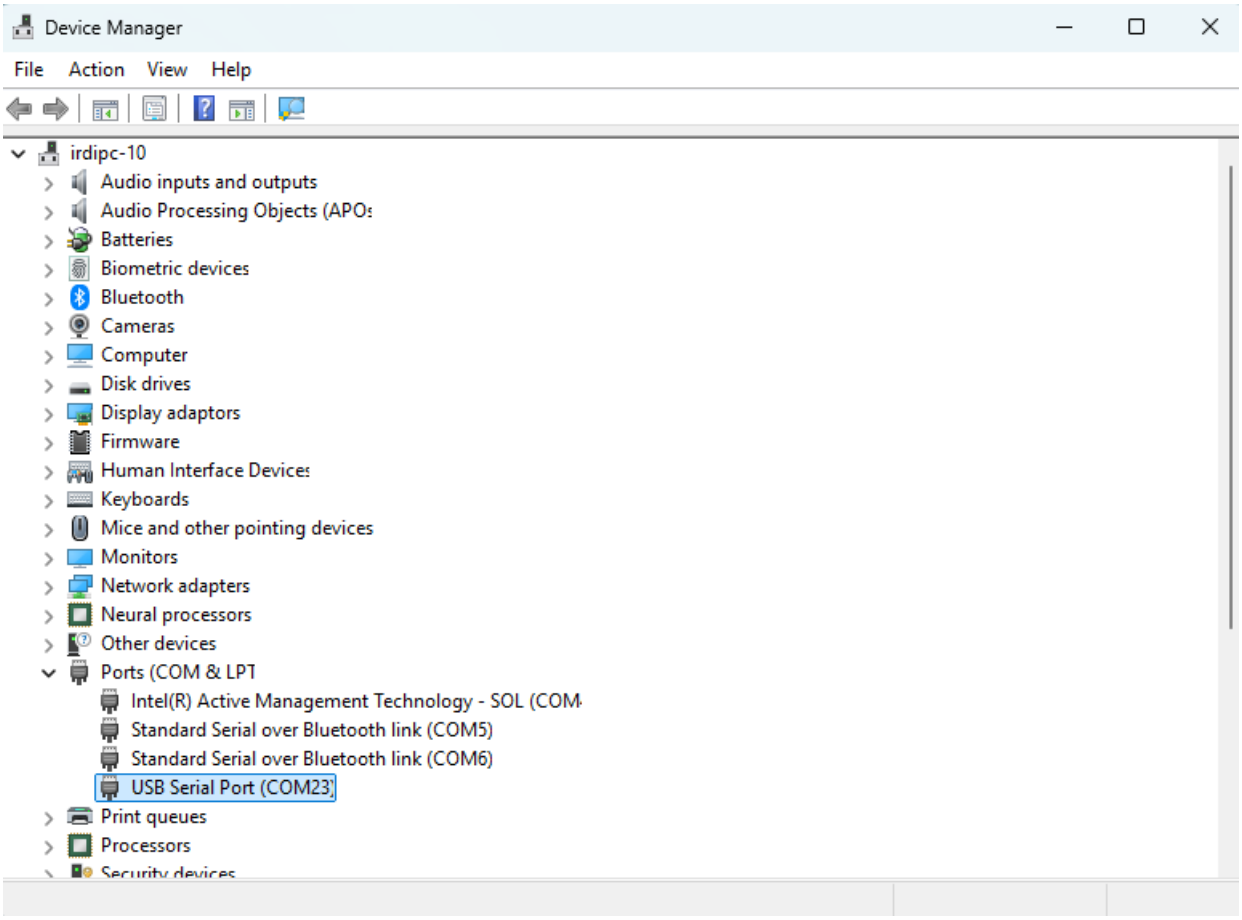

FIGURE 4-4: VERIFY IN DEVICE MANAGER

NOTE:

The large capacitance required for the IR data transmitter may result in large inrush currents when the USB plug is attached to the computer. This initial inrush current can drop the USB bus voltage such that other connected USB devices may stop working. If this occurs, unplug all USB devices, then plug in the IR data transmitter first, to allow the capacitors to charge, then plug in the remaining USB devices.

Also see Troubleshooting Section 6.1.

4.1.2 Installing the Test Transmitter Software

Locate the executable files for “200676_R03 - Test TX Free Software”.

Action	
STEP 1	Download the Test Transmitter Software – Free executable files on the software page of the IRDI website – see Figure 4-5.

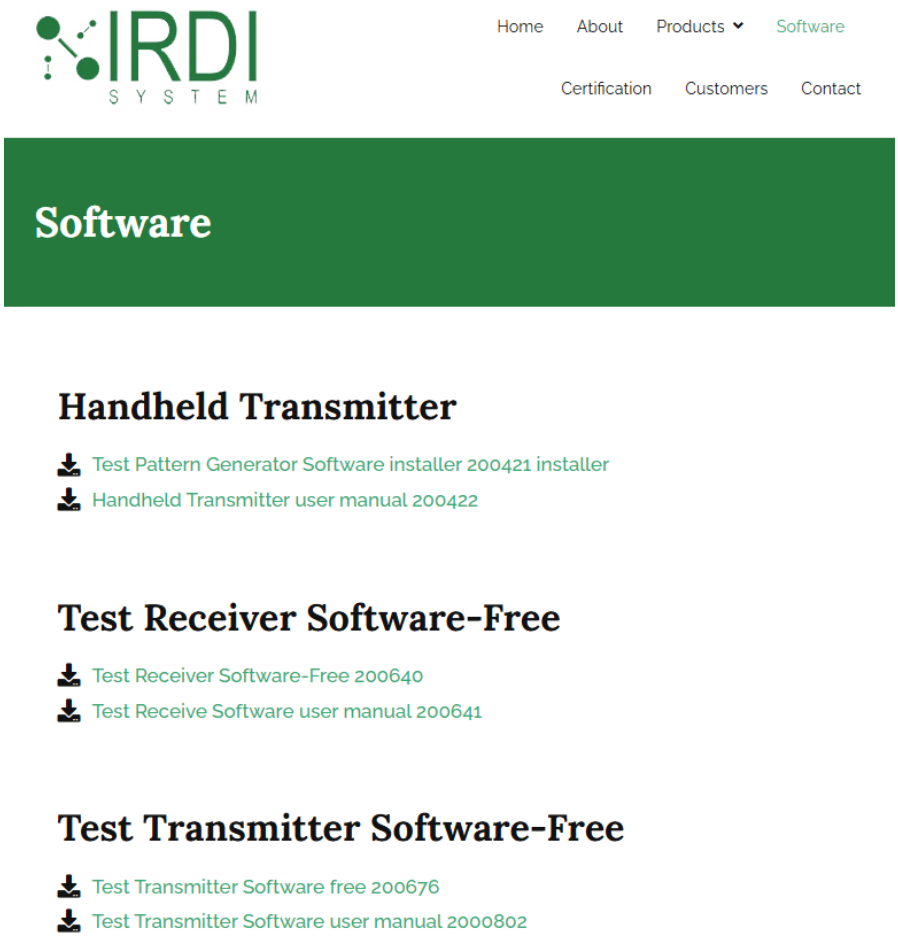

FIGURE 4-5: SOFTWARE PAGE OF IRDI WEBSITE

4.1.3 Locate and Start Test Transmitter Software

Locate Test Transmitter Software in the Start > All Programs.

Action	
STEP 1	Windows Start > 200676_R03 Test TX Free Software – see Figure 4-6.

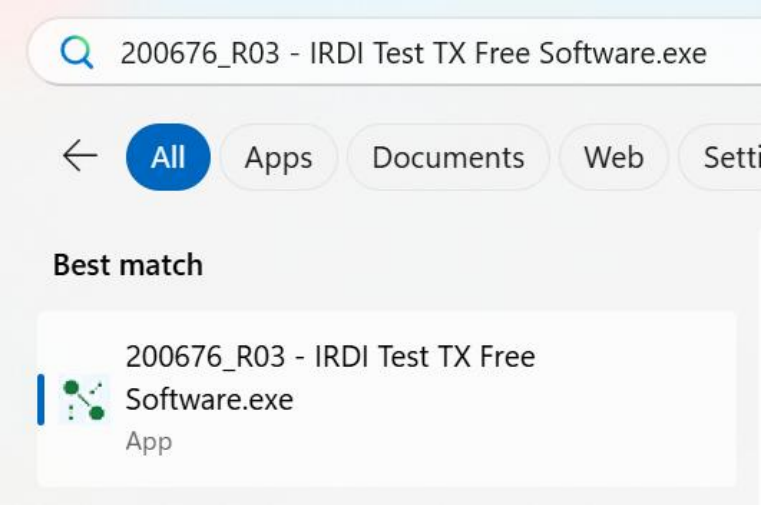

FIGURE 4-6: SOFTWARE SHORTCUT IN START MENU

5 USER GUIDE

5.1 UNDERSTANDING THE IR DATA MESSAGES

The IR data transmitter transmits IR data messages. The user can receive these messages via a user-supplied IR data receiver, and can view these messages using any terminal program, such as HyperTerminal.

Each message is a text string of fixed length, with a fixed set of fields. As the test messages are predefined and cannot be changed, the range of values is provided for reference only. The meaning of each field in the IR data message is as follows:

TABLE 2: IR DATA MESSAGE FIELDS

Field Identifier	Definition	Range of Values
ÿÿÿÿÿÀ	Delimiting characters that define start of IR data message	n/a
ID	Name of the communication protocol – in this case, SAE J2799	SAEJ2799
VN	Version number of the communications protocol	00.00 – 99.99
RT	Receptacle type – style of hydrogen receptacle used on the vehicle	H25, H35, H50 and H70
TV	Tank volume – the volume of the hydrogen tank in the vehicle	0000.0 – 5000.0 litres
FC	Fill command – indicates the type of hydrogen fill in progress, or the reason for the fill's termination	Dyna, Stat, Halt and Abort
MP	Measured pressure – the pressure reading of the hydrogen tank in the vehicle	000.0 – 100.0 MPa
MT	Measured temperature – the temperature reading of the hydrogen tank in the vehicle	16.0 – 425.0 K
MéÁ	Delimiting characters that define end of IR data message, plus checksum	Varies depending on the checksum

There is a paid version of the test transmitter software that allows user to edit the message fields.

5.2 USING THE TEST TRANSMITTER SOFTWARE

The test transmitter software and IR data transmitter provide the user with full control over the data display type of the transmitted messages.

To set up and use the IR data transmitter and test transmitter software, do the following:

	Action
STEP 1	Set up the IR data transmitter and test transmitter software as per Section 4.1.
STEP 2	Click on the "200676_R03 – Test TX Software" application to start the software. The software screen appears as shown in Figure 5-1.
STEP 3	Select the Port in the "COM Port" drop-down menu – see Figure 5-2 that corresponds to the IRDI Transmitter found in Device Manager – Figure 4-4.

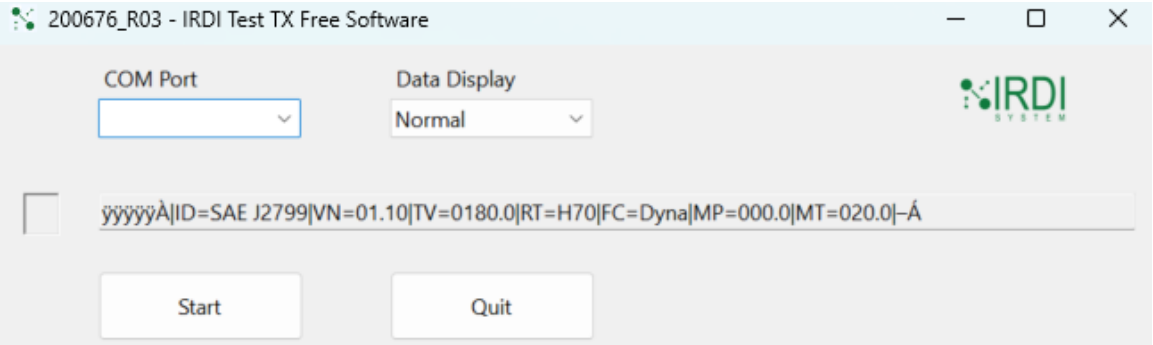

FIGURE 5-1: TEST TRANSMITTER SOFTWARE SCREEN

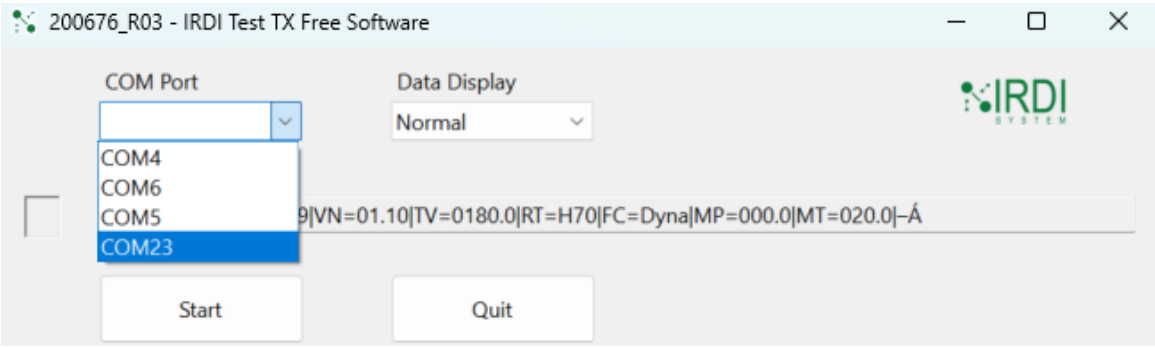

FIGURE 5-2: SELECTING COM PORT

To exit from the test transmitter software, click on the “Quit” button:

	Action
STEP 1	Click on the “Quit” button in the popup window, to close the program.

5.2.1 Starting/Pausing IR Data Transmission

The following message will be transmitted continuously:

ÿÿÿÿÿÀ|ID=SAE J2799|VN=01.10|TV=0180.0|RT=H70|FC=Dyna|MP=000.0|MT=020.0|–Á

The vertical lines (“|”) in the above message separate the individual fields that make up the IR data message. Each field begins with the field identifier (e.g. “TV”), followed by the “=” symbol and the numeric value assigned to that field (e.g. “0180.0”). For example, in the above message, TV (tank volume) has the value 0180.0, which means that the tank volume is 180 L (litres).

To start the IR data transmission from the computer, do the following:

	Action
STEP 1	Click on the “Start” button (see Figure 5-3). The text on the button will change to “Stop”. The indicator light next to the message will flash green. The transmitter’s USB red indicator will begin flashing.
STEP 2	Each message will be transmitted at 100ms intervals.

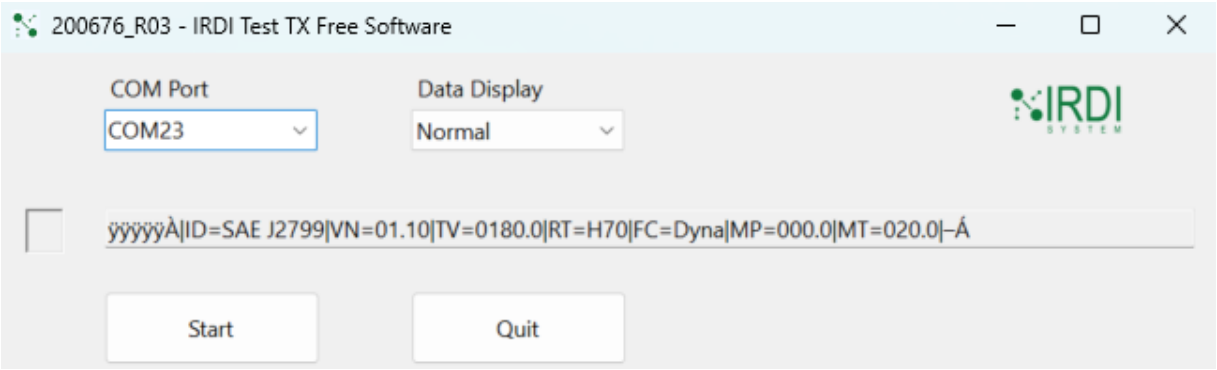

FIGURE 5-3: STATE AFTER SELECTING A COM PORT

To stop the IR data transmission, do the following:

	Action
STEP 1	Click on the “Stop” button (see Figure 5-4). The text on the button will change to “Start”. The indicator light next to the message will stop flashing. The trasmitter’s USB red flashing indicator will stop flashing.

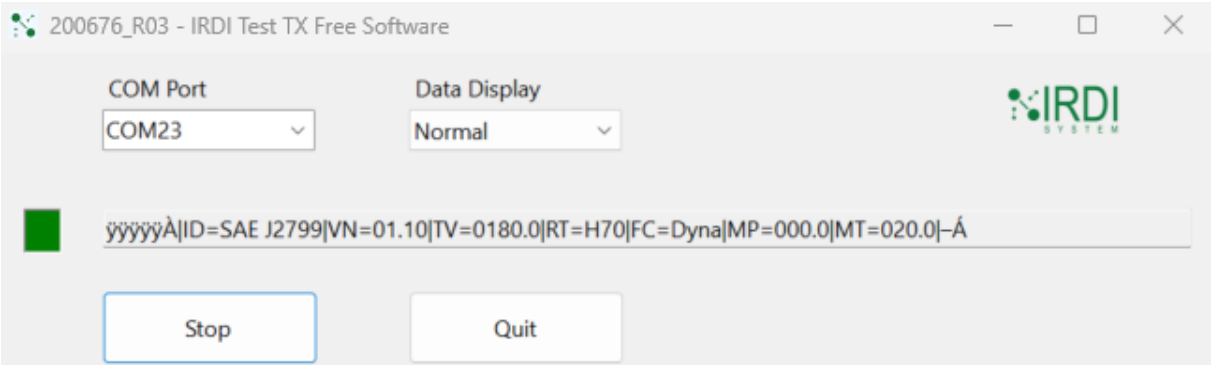

FIGURE 5-4: RUNNING STATE

5.2.2 Changing Data Display Format

To change the data display format of the message, do the following:

Backslash Format

Action	
STEP 1	To display the data in “Backslash Codes” format, click on the button under “Data Display”, then select “Backslash Codes” from the pull-down menu.
NOTES	The format of the message will switch to the “backslash” format, but the data values will not change as in Figure 5-5.

For this format, non-displayable characters are shown as a backslash ‘\’ followed by a character code. For example, “Line Feed” or [0x0A] displays as “\n”.

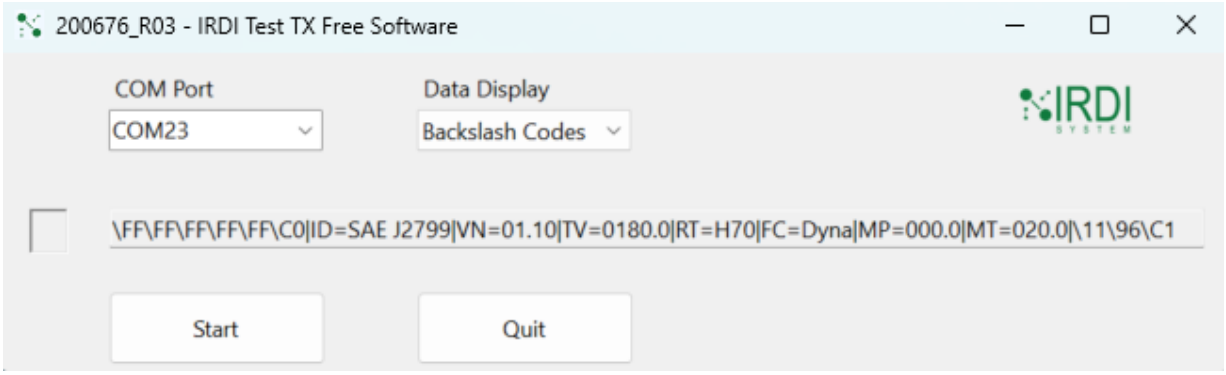

FIGURE 5-5: BACKSLASH DISPLAY

Hexadecimal Format

Action	
STEP 1	To display the data in “hexadecimal” format, click on the button under “Data Display”, then select “Hexadecimal” from the pull-down menu as in Figure 5-6.
NOTES	The format of the message will switch to the “hexadecimal” format, but the data values will not change. However, they will be shown as hexadecimal values.

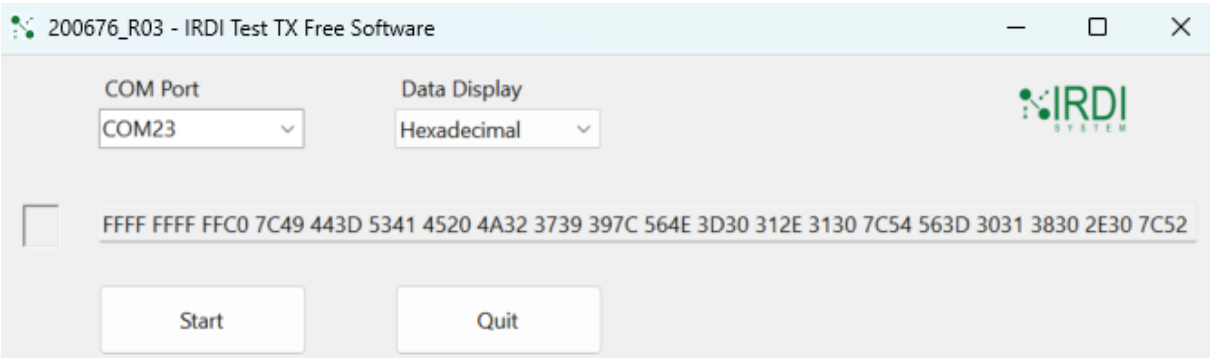

FIGURE 5-6: HEXADECIMAL DISPLAY

6 TROUBLESHOOTING

This section provides guidance on troubleshooting any issues the user may have when using the IR data transmitter.

6.1 PROBLEM: IR DATA TRANSMITTER DRIVERS DO NOT INSTALL AUTOMATICALLY

POSSIBLE ROOT CAUSE #1	
The IR data transmitter is plugged into an incompatible USB port.	
TROUBLESHOOTING STEPS	
1. Unplug the IR data transmitter from the computer.	
2. Plug the IR data transmitter into a different USB port on the computer.	
3. Allow the driver to install automatically.	
POSSIBLE ROOT CAUSE #2	
The IR data transmitter is drawing too much current. **NOTE:** The IR data transmitter can draw excessive current, causing other USB devices to stop working, and/or causing the IR data transmitter to fail to work.	
TROUBLESHOOTING STEPS	
1. Unplug the IR data transmitter from the computer.	
2. Unplug all other USB devices from the computer.	
3. Plug the IR data transmitter back into the USB port on the computer.	
4. Allow the driver to install automatically.	
5. Plug the other USB devices into their respective USB ports on the computer.	
POSSIBLE ROOT CAUSE #3	
The computer does not have internet access.	
TROUBLESHOOTING STEPS	
1. Check that the computer is plugged into an internet source, or is wirelessly connected to an internet source, and make sure that the computer has full internet access. If needed, talk with your IT service person to get assistance.	
2. Plug the IR data transmitter into a USB port on the computer.	
3. Allow the driver to install automatically.	

6.2 PROBLEM: IR DATA NOT BEING TRANSMITTED/RECEIVED

If the IR data transmitter is connected, the test transmitter software is running, and the "IRDI USB Device Status" reads "Connected & Ready.", but **the receiver is not reading IRDI messages**, do the following:

POSSIBLE ROOT CAUSE #1	
Data is not getting from the transmitter to the receiver.	
TROUBLESHOOTING STEPS	
1. Check that the IR data transmitter is transmitting by pointing the cell phone camera at it. If you can see the LEDs inside the transmitter flashing, then data is being transmitted.	
2. Check that the IR data receiver is positioned facing the IR data transmitter, and that the receiver and transmitter are within 25 cm of each other.	
3. Check that the surfaces of the transmitter and receiver are dust-free and not obstructed.	