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Test TX Free Software User Manual

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Approvals

Revision	Name	Title	Signature
2.0	Edward Li	General Manager	

Revision History

Revision	Date	Responsible Person	Description
1.0	June 8, 2020	Derek Soo	First revision release
2.0	Oct 16, 2020	Derek Soo	LVNXG with Installer

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Contact

Edward Li, General Manager
 IRDI System Inc.
 edward.li@irdisystem.com


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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.
IDT	IRDI USB Direct Tx – the product discussed in this manual, which is used to test infrared data communications.

APPLICABLE DOCUMENTS

The following documents are recommended as reference material.

Document Reference	Document Title	Document Number
[1]	SAE J2799 technical information report	J2799

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1 SCOPE

This user manual provides detailed instructions on setting up and using the **IRDI USB Direct Tx (IDT)**. 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 infrared as the physical communication method.

The **IDT** is a lab test system, consisting of an IR data transmitter and a software program, that can be used together to do the following:

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

The **IDT** infrared transmitter hardware is used with the IDT LabVIEW-based program. Test messages are predefined and cannot be changed. The IDT program is installed on a computer, and the IDT transmitter is plugged into one of the computer's USB ports.

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3 REQUIREMENTS

This section provides the lists of equipment needed.

TABLE 1: REQUIRED EQUIPMENT

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

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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 an infrared data transmitter with a USB cable, and a LabVIEW-equipped computer.

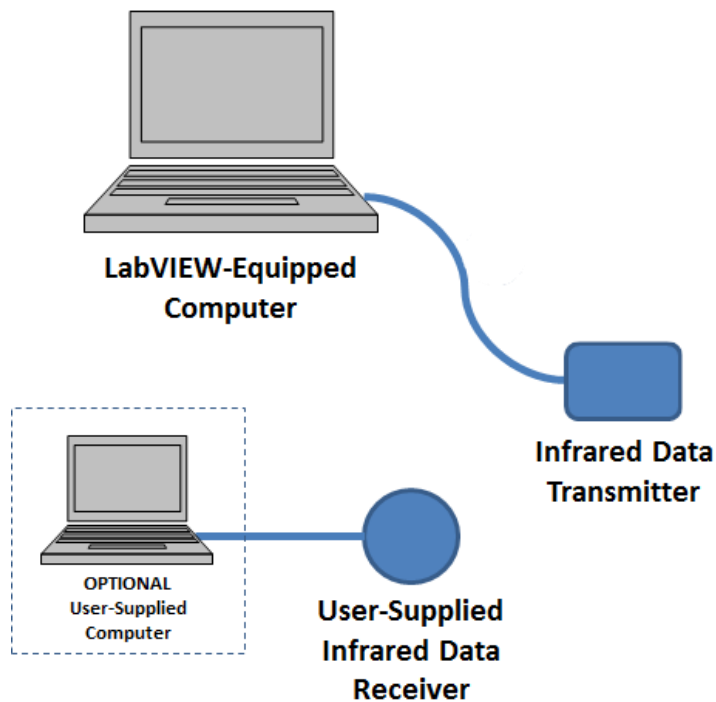


FIGURE 4-1: REQUIRED HARDWARE

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


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



FIGURE 4-2: USB IR-TX DEVICE

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4.1.1 Installing the Infrared Data Transmitter

To set up infrared data transmitter hardware, be sure that you are connected to the internet, then follow the steps below, and see Figure 4-2.

Action	
STEP 1	Insert the infrared data transmitter’s USB plug into an available USB port on the LabVIEW-equipped 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

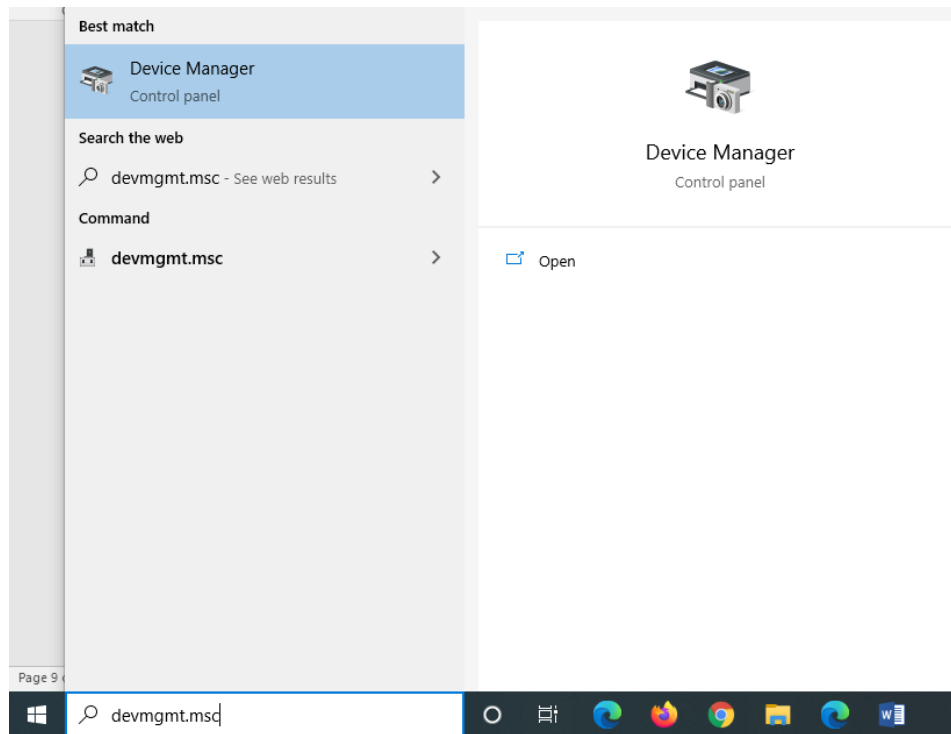


FIGURE 4-3 OPEN DEVICE MANAGER

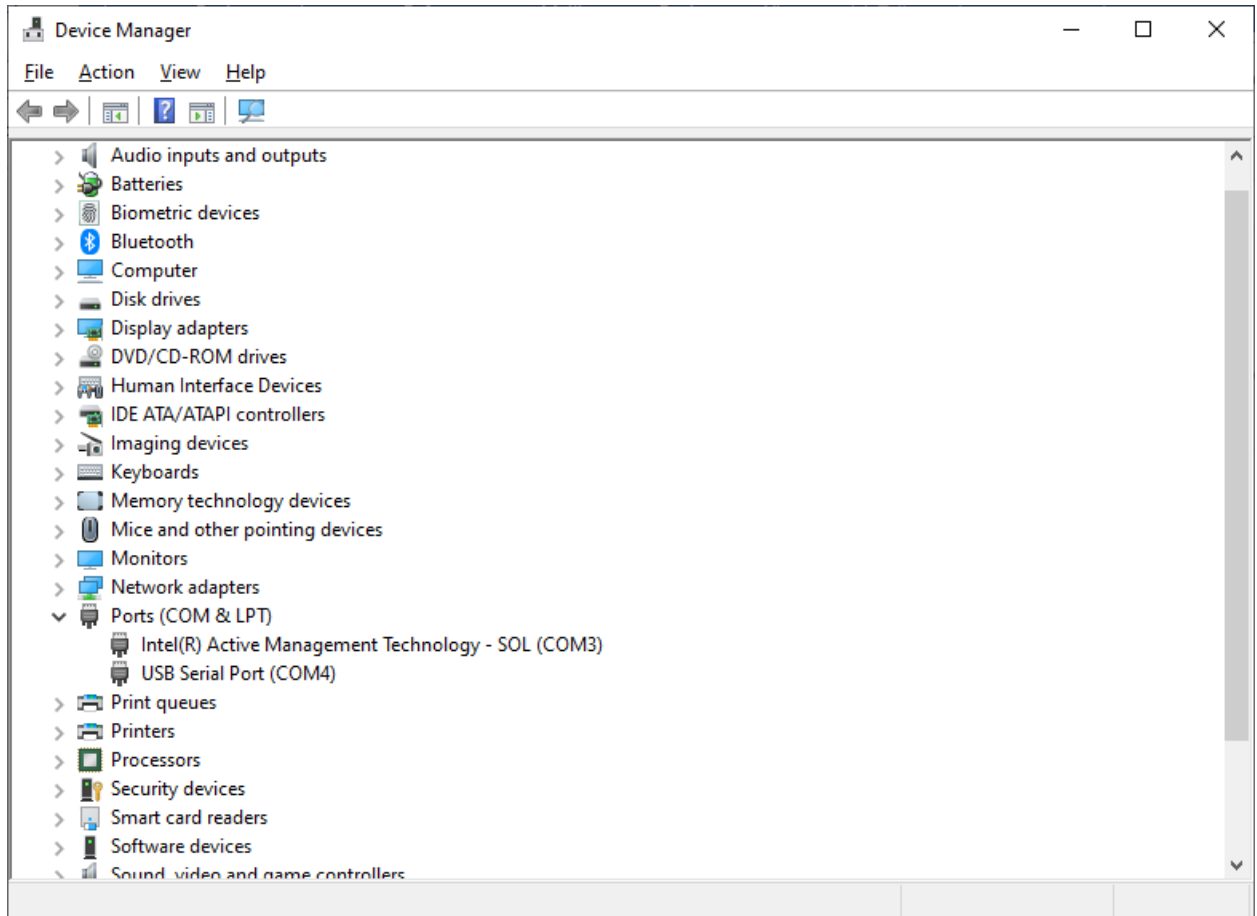


FIGURE 4-4 VERIFY IN DEVICE MANAGER



NOTE:

The large capacitance required for the IDT 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 IDT data transmitter first, to allow the capacitors to charge, then plug in the remaining USB devices.

Also see Troubleshooting Section 6.1.

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4.1.2 Installing the USB Direct IRDI Software

Locate the Installation files for 200676_R02 Test TX Free Software.

Action	
STEP 1	Run the install.exe to begin – see Figure 4-5.

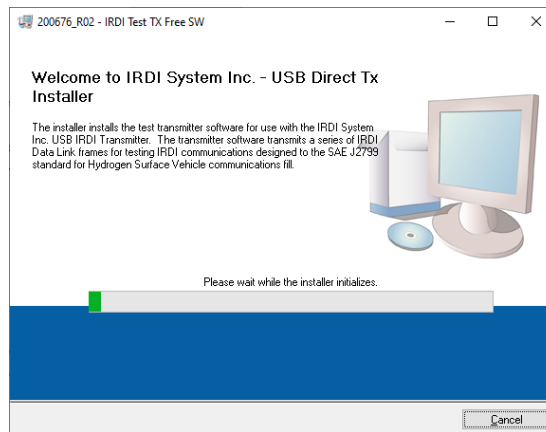


FIGURE 4-5 INSTALLER SPLASH SCREEN

Action	
STEP 2	Select Destination Directory – see Figure 4-6. Click Next >>.

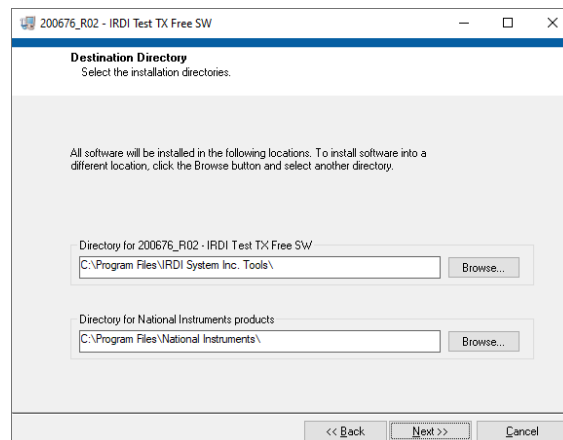



FIGURE 4-6 DESTINATION DIRECTORY

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Action	
STEP 3	Accept License Agreements – see Figure 4-7. Click Next >>.

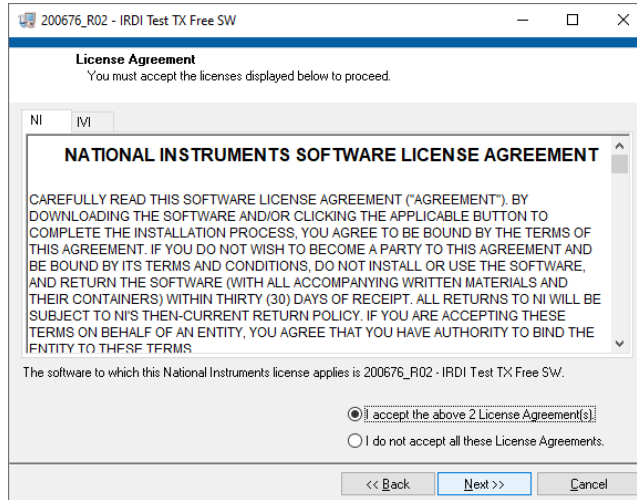


FIGURE 4-7 LICENSE AGREEMENT ACCEPTANCE

Action	
STEP 4	Disable Windows Fast Startup – see Figure 4-8. Click Next >>.

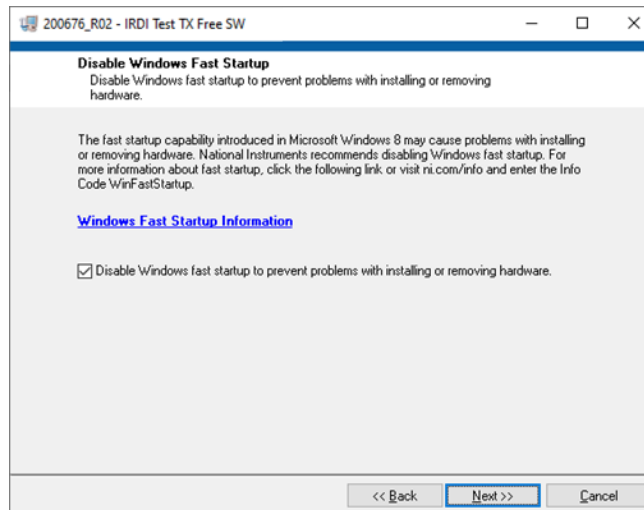



FIGURE 4-8 DISABLE WINDOWS FAST STARTUP

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Action	
STEP 5	Review Component Installation – see Figure 4-9. Click Next >>.

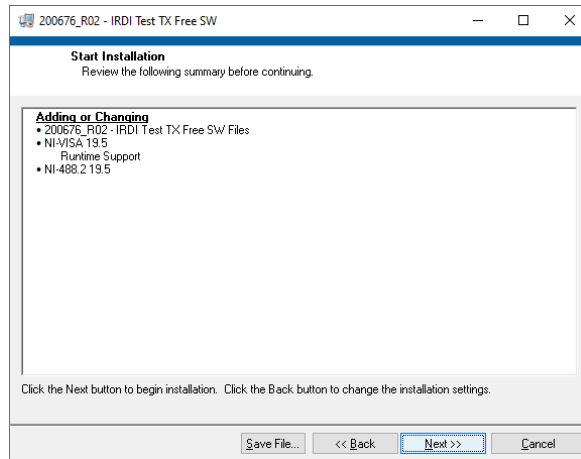


FIGURE 4-9 REVIEW COMPONENTS TO INSTALL

Action	
STEP 6	Allow components and software to Install – see Figure 4-10. When done, click Next >>.

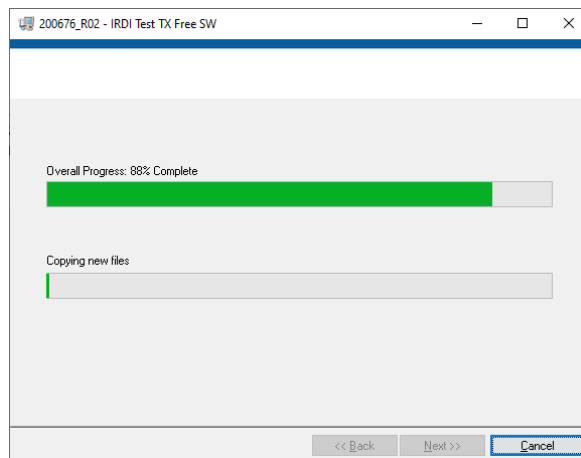



FIGURE 4-10 INSTALLING SOFTWARE

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Action	
STEP 7	Installation Complete – see Figure 4-11. Click Next >>.

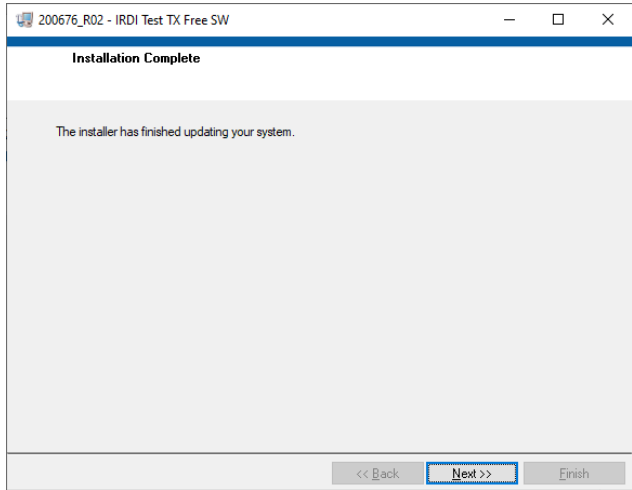


FIGURE 4-11 INSTALLATION COMPLETE

Action	
STEP 8	Restart – see Figure 4-12. Click Restart.

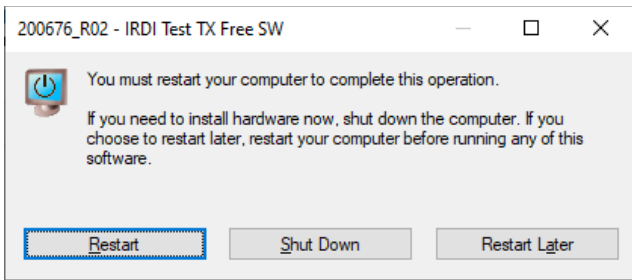



FIGURE 4-12 RESTART COMPUTER

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4.1.3 Locate and Start USB Direct IRDI Software

After restarting, locate USB Direct IRDI Software in the Start > All Programs.

Action	
STEP 1	Windows Start > IRDI USB Direct Tx > 200676_R02 Test TX Free Software – see Figure 4-13.

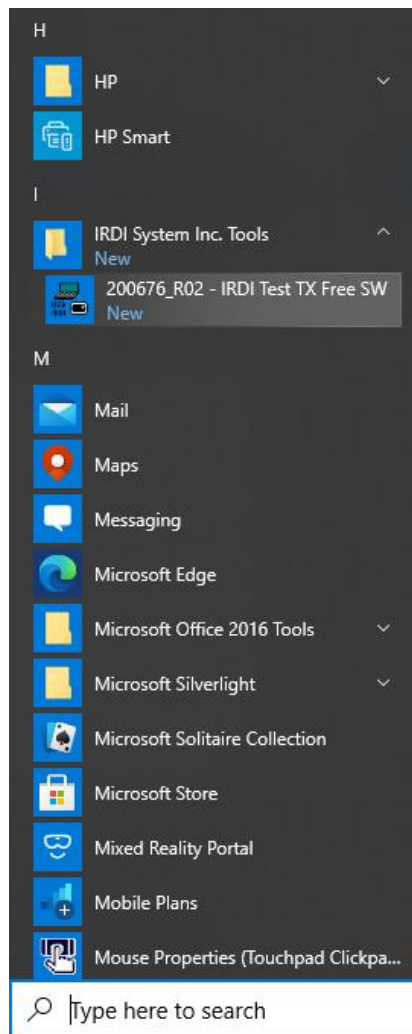


FIGURE 4-13 SOFTWARE SHORTCUT IN START MENU

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5 USER GUIDE

5.1 UNDERSTANDING THE INFRARED DATA MESSAGES

The IDT transmits infrared data messages through an infrared data transmitter. The user can receive these messages via a user-supplied infrared 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. The meaning of each field in the infrared data message is as follows:

TABLE 2: INFRARED DATA MESSAGE FIELDS

Field Identifier	Definition	Range of Values
ÿÿÿÿÀ	Delimiting characters that define start of infrared 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 infrared data message, plus checksum	Varies depending on the checksum

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5.2 USING THE IRDI IDT LABVIEW SOFTWARE

The IRDI IDT LabVIEW software and IDT data transmitter provide the user with full control over the transmitted infrared data messages, allowing the user to generate test messages to the infrared data transmitter using manually-entered data.

To set up and use the IDT hardware and software, do the following:

Action	
STEP 1	Set up the hardware and IDT software as per Section 4.1.
STEP 2	Start the LabVIEW Software equipped computer.
STEP 3	Click on the “200676_R02 – Test Tx Software” application to start the IDT LabVIEW program. The program screen appears as shown in Figure 5-1.
STEP 4	Select the Port in the TX Resource drop-down menu – see Figure 5-2 that corresponds to the IRDI Transmitter found in Device Manager – Figure 4-4.

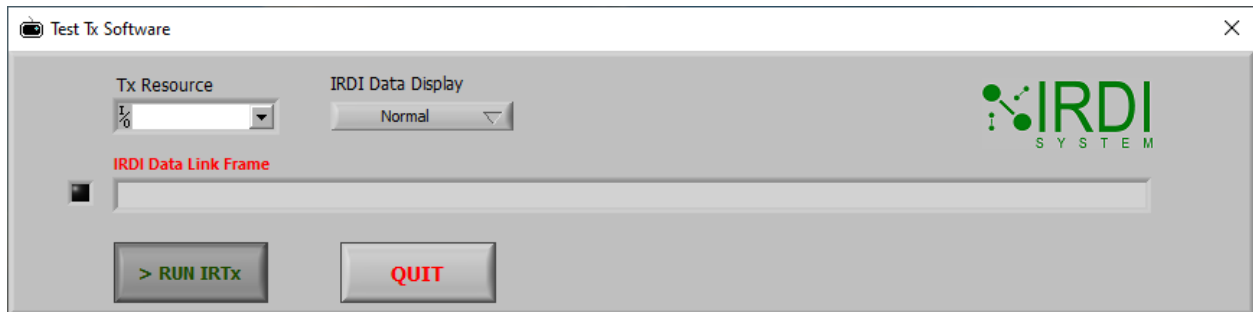


FIGURE 5-1: IDT LABVIEW SOFTWARE SCREEN

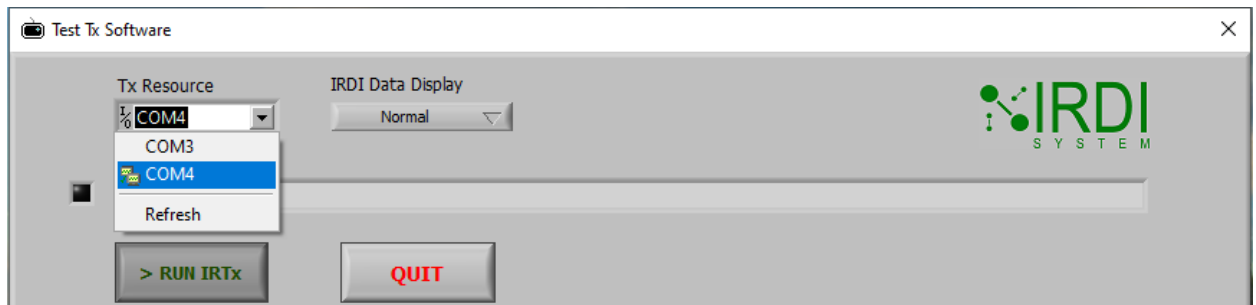


FIGURE 5-2: COMMUNICATIONS ERROR MESSAGE

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

Action	
STEP 1	Click on the "> Run IRTx" button (see Figure 5-4). The text on the button will change to " Pause IRTx". The indicator light next to the "IRDI Data Link Frame" will flash green. The transmitter's red indicator will begin flashing.
STEP 2	Each line will be transmitted at 100ms intervals.

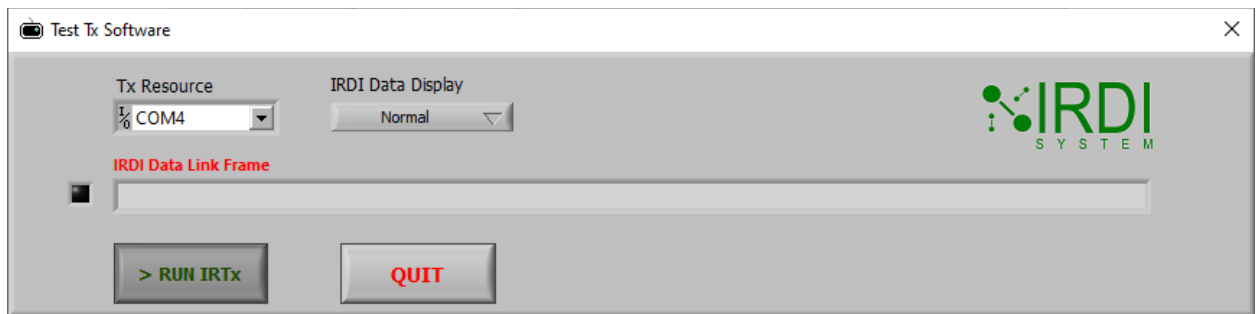



FIGURE 5-4: INITIAL PAUSED STATE

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To stop the infrared data transmission, do the following:

Action	
STEP 1	<p>Click on the “ Pause IRTx” button (see below). The text on the button will change to “> Run IRTx”. The indicator light next to the “IRDI Data Link Frame” will stop flashing. The transmitter’s red flashing indicator will stop flashing as in Figure 5-5.</p>

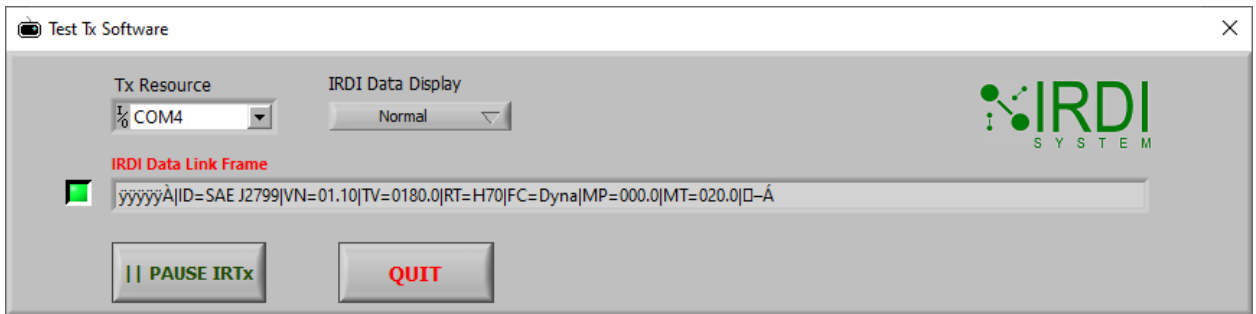


FIGURE 5-5: RUNNING STATE

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5.2.3 Viewing Transmitted Infrared Data

To view the infrared data being transmitted, see the “IRDI Data Link Frame” window (see below) – the infrared data message is refreshed in this window every 100 ms.

To the left of this window is an indicator light, which blinks green when the transmitter is sending infrared data messages. See Figure 5-6.

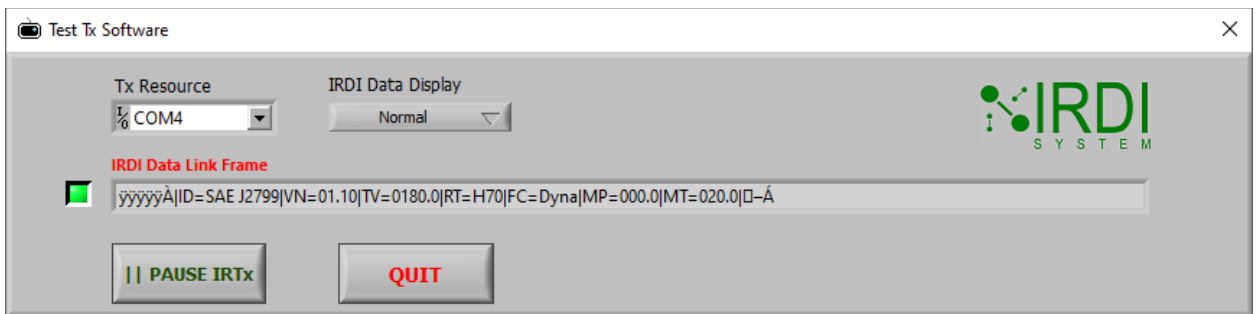



FIGURE 5-6: IRDI RUNNING STATE

Each infrared data message in the “IRDI Data Link Frame” window looks similar to the following string:

```
ÿÿÿÿÿÿÀ|ID=SAE J2799|VN=01.10|TV=0180.0|RT=H70|FC=Dyna|MP=000.0|MT=020.0|D-Á
```

The vertical lines (“|”) in the above string separate the individual fields that make up the infrared 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).

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5.2.4 Changing Data Display Format

To change the format of the data displayed in the “IRDI Data Link Frame” window, do the following:

Backslash Format

Action	
STEP 1	To display the data in “backslash” format, click on the button under “IRDI Data Display Format”, then select “Backslash Codes” from the pull-down menu.
NOTES	The format of the data displayed in the “IRDI Data Link Frame” window will switch to the “backslash” format, but the data values will not change as in Figure 5-7.

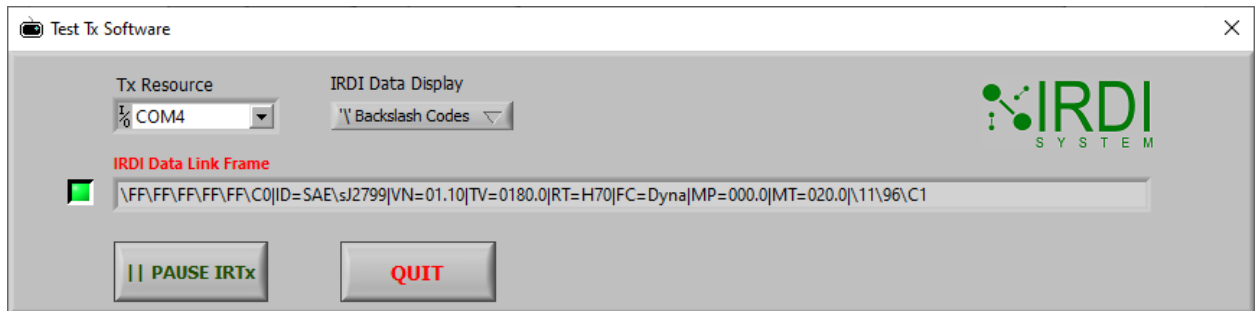



FIGURE 5-7: BACKSLASH DISPLAY

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Hexadecimal Format

Action	
STEP 1	To display the data in “hexadecimal” format, click on the button under “IRDI Data Display Format”, then select “Hexadecimal” from the pull-down menu as in Figure 5-8.
NOTES	The format of the data displayed in the “IRDI Data Link Frame” window will switch to the “hexadecimal” format, but the data values will not change. However, they will be shown as hexadecimal values.

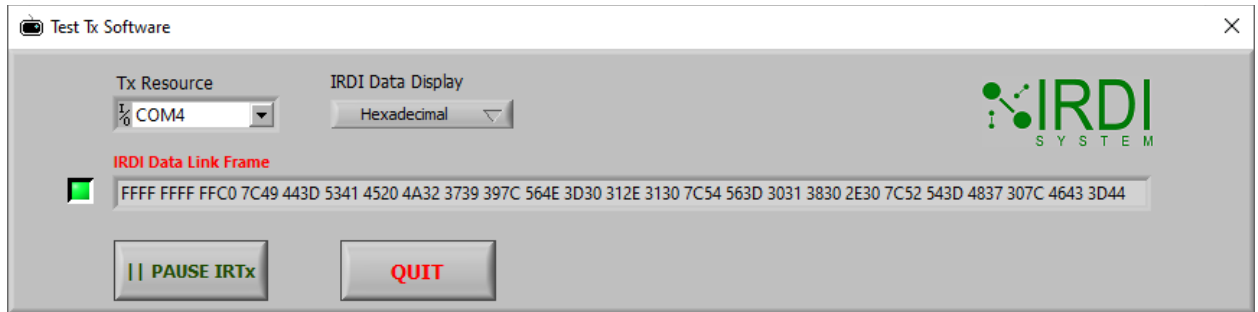


FIGURE 5-8: HEXADECIMAL DISPLAY

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6 TROUBLESHOOTING

This section provides guidance on troubleshooting any issues the user may have when using the IDT.

6.1 PROBLEM: IDT TRANSMITTER DRIVERS DO NOT INSTALL AUTOMATICALLY


POSSIBLE ROOT CAUSE #1	
The IDT transmitter is plugged in to an incompatible USB port.	
TROUBLESHOOTING STEPS	
1. Unplug the IDT transmitter from the computer.	
2. Plug the IDT transmitter into a different USB port on the computer.	
3. Allow the driver to install automatically.	
POSSIBLE ROOT CAUSE #2	
The IDT transmitter is drawing too much current. NOTE: The IDT can draw excessive current, causing other USB devices to stop working, and/or causing the IDT transmitter to fail to work.	
TROUBLESHOOTING STEPS	
1. Unplug the IDT transmitter from the computer.	
2. Unplug all other USB devices from the computer.	
3. Plug the IDT 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 IDT transmitter into a USB port on the computer.	
3. Allow the driver to install automatically.	

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6.2 PROBLEM: INFRARED DATA NOT BEING TRANSMITTED/RECEIVED

If the IDT transmitter is connected, the LabVIEW program is running, and the “IRDI USB Device Status” reads “Connected & Ready.”, but **the receiver is not reading IRDI packets**, do the following:

POSSIBLE ROOT CAUSE #1	
Data is not getting from the transmitter to the receiver.	
TROUBLESHOOTING STEPS	
1. Check that the infrared data receiver is positioned facing the infrared data transmitter, and that the receiver and transmitter are within 25 cm of each other.	
2. Check that the surfaces of the transmitter and receiver are dust-free and not obstructed.	

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