Small Form Factor (LBSF Series) USB Interface Guide

Overview

LadyBug LBSFxxx products are designed for flexible programmatic control, making them ideal for manufacturing test environments and a wide range of automated test equipment (ATE) systems. Their compatibility with common programming environments—such as Python, MATLAB, LabVIEW, and NI VISA—enables easy integration into production lines and remote test setups.

The power sensors support two USB interface modes: USBHID and USBTMC. Only one mode can be active at a time. USBHID is the default shipping configuration and is compatible with LadyBug's software. This guide explains how to use standard SCPI commands to configure the interface as needed.

Summary Points Regarding the USB Interface Mode

- Users can switch between USB interface modes themselves by sending standard SCPI commands to the power sensor.

- The sensors ship with the USB HID interface enabled by default, and use LadyBug's PMA-12 and Interactive IO Control.

  - The LadyBug Interactive IO can be used to change the sensor's USB Interface mode to USBTMC.

  - The sensor is not accessible by LadyBug's Interactive IO after and while it is in the USBTMC Mode.

- While in USBTMC mode, a USBTMC Interactive IO control such as NI-VISA Interactive Control can be used to operate the sensor. This same Interactive IO can be used to change the sensor's USB Interface mode back to USB HID.

- This dual interface capability enables compatibility with a wide range of software and automation tools, supporting both interactive use and remote instrument control.

- USBHID mode utilizes Microsoft's built in USBHID driver. USBTMC mode utilizes any customer installed USBTMC VISA driver.

- New USB Class takes effect after power is cycled

Small Form Factor product USB Interface Command Detail

Command:

SYSTem:COMMunicate:USB:INTerface

Syntax:

Most common forms:

       SYST:COMM:USB:INT?

       SYST:COMM:USB:INT [USBTMC|USBHID]

Long forms:

       SYSTem:COMMunicate:USB:INTerface?

       SYSTem:COMMunicate:USB:INTerface [USBTMC|USBHID]

Important Notes:

-      Factory Default Condition: USBHID

-      New USB Class takes effect after power is cycled

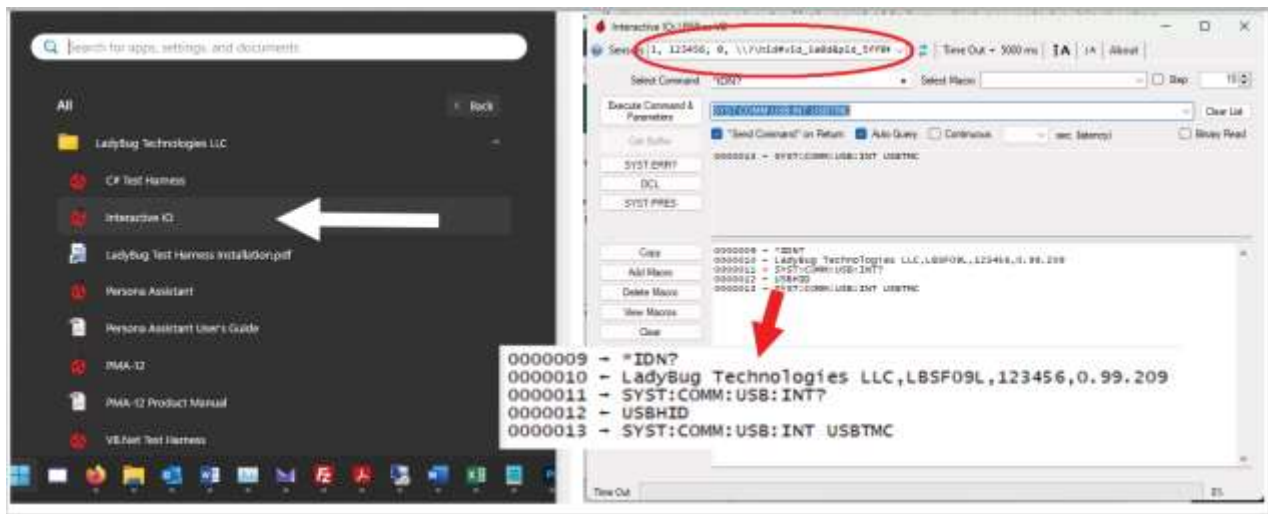**Using LadyBug's Interactive IO to Change to USBTMC**

Figure 1 - LadyBug Interactive IO

Referring to Figure 1:

1. Connect the sensor and open the LadyBug Interactive IO. The sensor will appear at the upper left (circled in red). If it was connected after starting the program, click the two circular arrows to refresh the device list.

2. To verify functionality, send the query
   *idn?
   Response will be the sensors details as shown on line 10 of Figure 1.

3. To verify the current interface, send the query
   SYST:COMM:USB:INT?
   As shown on Figure 1, line 12, the sensor should report USBHID, LadyBug's Interactive IO uses USB HID only. If set to USBTMC, this software will not respond, and VISA-based tools such as NI Interactive IO are needed instead.

4. To change the mode to USBTMC, send:
   SYST:COMM:USB:INT USBTMC
   The change will not take effect until the sensor is power cycled. After cycling power, LadyBug Interactive IO will no longer communicate with the sensor, and VISA-based software must be used.

5. To change the interface back to USB HID, refer to the next section, *Using NI VISA Test Panel Input/Output Control to Change to USBHID*

The sensor must be power cycled for these changes to take effect.

Using NI VISA Test Panel Input/Output Control to Change to USBHID

When using the NI VISA Input/Output control to send SCPI commands, remember that certain parts of the command include non-visible ASCII characters—such as the space (0x20, \s) and newline (0x0A, \n)—which are often required for correct communication with instruments. By default, the NI VISA Test Panel automatically appends these characters to your commands and includes them in instrument responses.
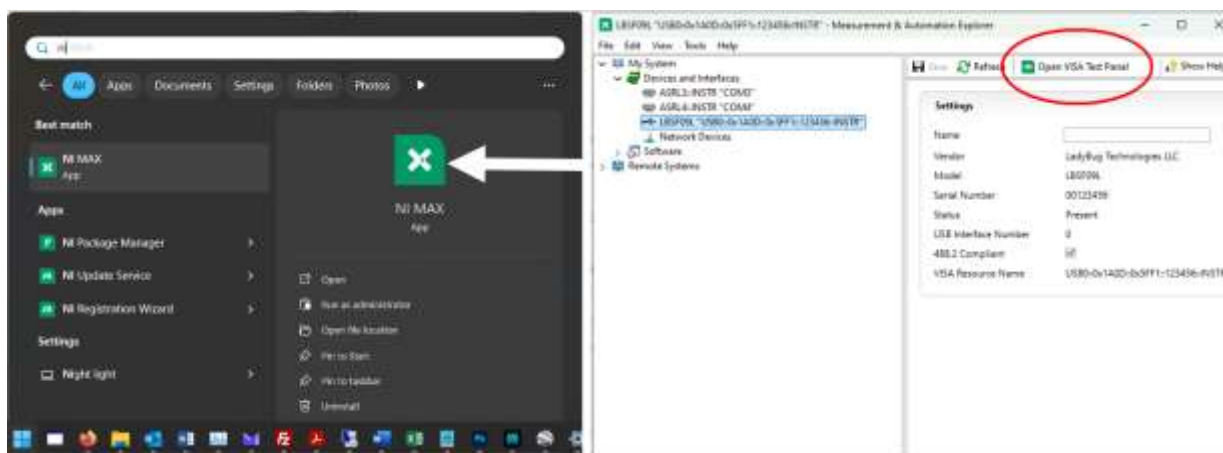

Figure 2 - Install and Open NI VISA

Referring to Figure2:

1. Download and install NI-VISA from National Instruments.

2. With the LBSF series sensors connected and in USBTMC mode, open the NI software
   The sensor will appear in the Devices and Interfaces list Figure 2, right in the left panel.

3. Select the sensor in the list
   A panel opens at right with details, it is not necessary to complete these details.
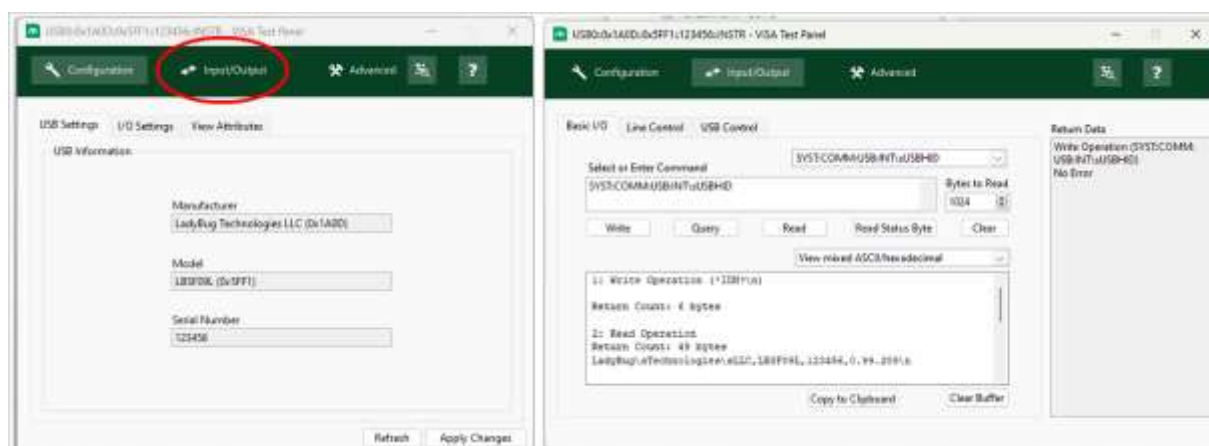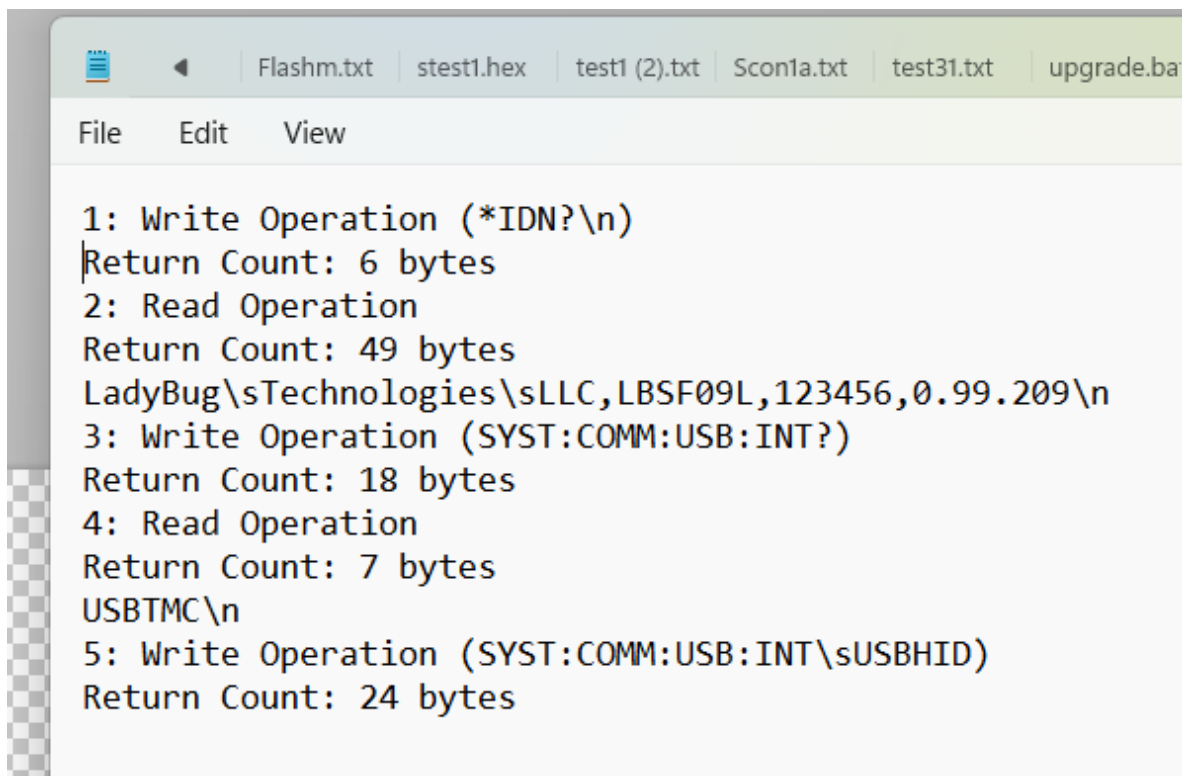

Figure 3 - NI VISA Input/Output Control

4. Click the Open VISA Test Panel (circled in red)
   A new window opens, shown in Figure 3, left.

5. Click Input/Output (circled in red)

A new window opens, shown in Figure 3, right.

6. The Input/Output console self-completes the *IDN? query, and further ads the \n (new line character) automatically. Click the Query button.
   Sensor Console returns ID string, including \n character.

7. Enter the SCPI query SYST:COMM:USB:INT?
   Sensor returns USBTMC\n

8. Enter the SCPI command SYST:COMM:USB:INT USBHID
   No return is expected, if sent as a query an error will be issued.

9. Done, command summary listed in Figure

The sensor must be power cycled for these changes to take effect.

```
Flashm.txt   stest1.hex   test1 (2).txt   Scon1a.txt   test31.txt   upgrade.ba

File   Edit   View

1: Write Operation (*IDN?\n)
Return Count: 6 bytes
2: Read Operation
Return Count: 49 bytes
LadyBug\sTechnologies\sLLC,LBSF09L,123456,0.99.209\n
3: Write Operation (SYST:COMM:USB:INT?)
Return Count: 18 bytes
4: Read Operation
Return Count: 7 bytes
USBTMC\n
5: Write Operation (SYST:COMM:USB:INT\sUSBHID)
Return Count: 24 bytes
```

Figure 4 - NI VISA Command Summary