

Advanced HART USB Interface

HFI400

Datasheet

HART®
Fieldbus
Profibus
Intrinsic Safety
Configuration Tools
Semiconductors
Training
Custom Design



Features

- Seamlessly enables communication between your USB enabled PC and any HART network
- Supports Windows 98, NT, 2000, XP machines with USB 1.0 or above
- Works with HART products from multiple manufacturers
- System powered: no external power supply required
- Available with Smar Research CONF401 HART configuration software
- Serves as integrated CONF401 dongle, no extra hardware dongle required when purchased with CONF401.
- “Smart Interface” allows firmware downloads via USB port
- Isolation of 1500V DC between the field instrument and USB adaptor pins
- Plastic coiled cable with pinch connectors for easy connection to HART network
- Very low leakage (Max 10 μ A @ 35V dc) current to the process network
- Future firmware upgrades to support Foundation Fieldbus and Profibus from same set of terminals

General Overview

The Smar Research HFI400 HART USB interface provides a complete physical link between any HART compliant field instrument and a Windows 98, NT, 2000, or XP PC with USB ports. The interface is fully self contained and requires no external power supply. Combined with the Smar Research CONF401 software, the HFI400 enables communication and configuration of any HART compliant device from anywhere on the HART network via your PC. The HFI400 is available standalone without CONF401 or as a package with the CONF401 software. Both packages contain RJ11 pinch connector probes, and a USB cable.

The HFI400 was built with the future in mind. The HFI400 features a “smart interface” which allows the user to easily upgrade the internal firmware via USB when such revisions and upgrades are available. Future upgrades to the HFI400 are in development which will enable it to communicate in additional protocols, such as Foundation Fieldbus, from the same set of terminals. This is all made possible by the latest result in Smar Research's newest integrated circuit, the HTFB5050. These features are a result of the Smar Research HTFB5050 ASIC embedded within the HFI400. The HFI400 combined with the HTFB5050 ASIC enables a flexibility and robustness unmatched by any process control network interface on the market.

In the following sections, the hardware and software of the HFI400 will be briefly discussed along with the installation procedures and technical information. For more information on the CONF401 software, refer to the CONF401 Datasheet, which can be downloaded from our website, <http://www.smarresearch.com>.

Hardware Overview

The HFI400 has two main components and two main connectors. The Mitsubishi M16C and the Smar Research HTFB5050 comprise the two main internal components. These components correlate directly to the two main connections of the HFI400, the USB connector and the RJ11 connector to the network. The Mitsubishi M16C handles all USB communications through the USB connector. Incoming and outgoing USB messages are decoded/encoded and processed accordingly inside the M16C. The HTFB5050 serves as the interface to the HART network by encoding outgoing messages in byte format into their appropriate protocol format and decoding incoming messages into byte format to be sent to the M16C. In this way, these two components combined with supporting analog circuitry effectively create the USB to HART network interface.

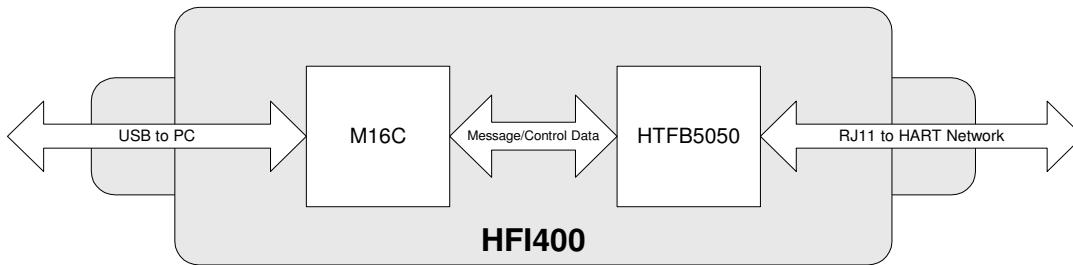


Fig. 1 – HFI400 Hardware Block Diagram

Software Overview

The HFI400 is designed to function seamlessly with the Smar Research CONF401 HART configuration software. This software allows the communication and configuration of any HART compliant device. The HFI400 and CONF401 work together to give the user quick and easy access to any HART device. When purchased together, the HFI400 serves the additional purpose of acting as a dongle for the CONF401 software. This dual purpose keeps additional USB or parallel ports free for other uses and lowers overall cost.

For information on the installation and operation of CONF401, please refer to the CONF401 Datasheet. For information on the different packages available, visit the Smar Research website: <http://www.SmarResearch.com> or contact a Smar sales representative.

Setup & Installation

Connecting the HFI400 to your computer:

Connect the USB cable to an available USB port of your computer. Connect the other end of the USB cable to the USB port of the HFI400. If this is the first time you have connected the HFI400 to your computer, the USB Drivers must be installed. Please read *Installing the Windows Driver* section below.

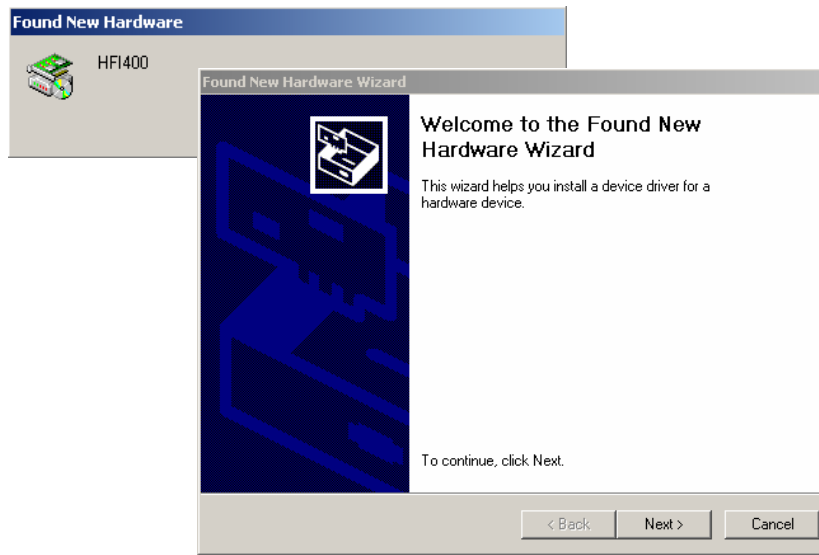
NOTE:

Connection of the HFI400 through a USB hub is not recommended, and proper functionality cannot be guaranteed. If using a USB hub is required, it must be a powered hub.

Installing the Windows USB Driver:

The first time the HFI400 is connected on your Windows computer, the Windows USB driver must be installed. To properly install the USB drivers, the Smar Research Product CD that was included with the HFI400 is required. Please follow the instructions below:

1. After connecting the HFI400 to your computer, a Found New Hardware window will pop-up followed by the Found New Hardware Wizard. Click "Next" to continue.

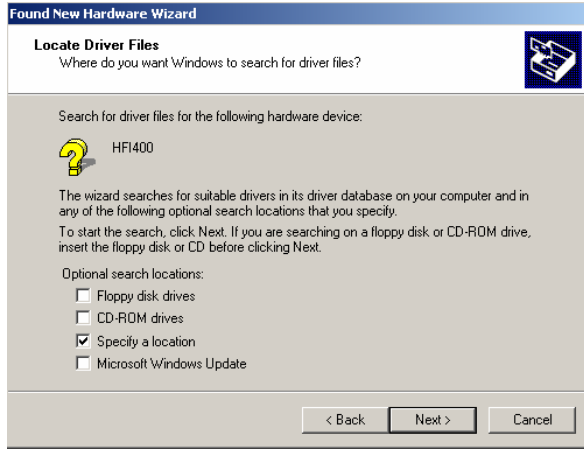


2. In the following window, make sure the "Search for a suitable driver for my device" button is selected and click "Next".

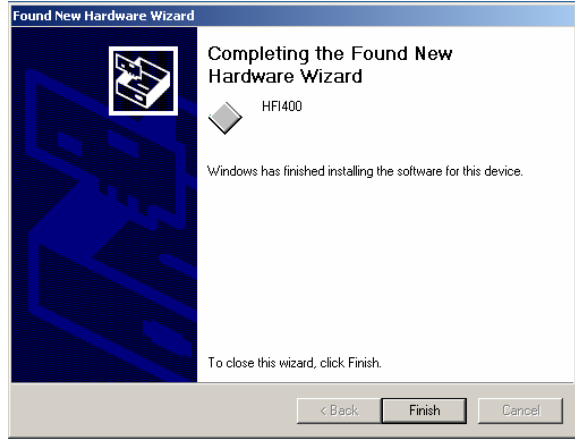
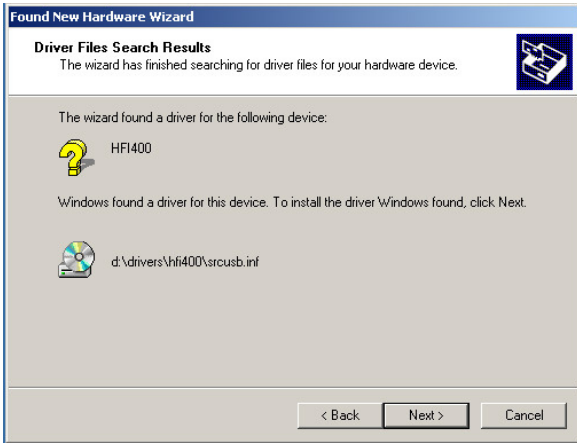


Setup & Installation (contd.)

3. In the next window, select the “Specify a Location” box and click “Next”. This will open another window which prompts the user to enter the location of the driver files. Click the browse button and browse to the CD-ROM drive containing the Smar Research Product CD. Locate the “Drivers\HFI400” folder on the Smar Research Product CD and click “OK”. For Example, if the CD-ROM drive letter containing the Smar Research Product CD is D, browse to the following directory: D:\Drivers\HFI400

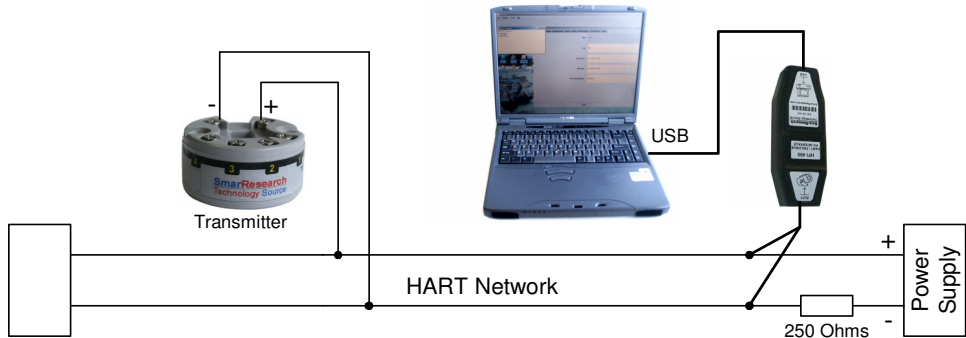


4. A new window should indicate that the wizard has found a driver for the HFI400. Click “Next”. This completes the Found New Hardware Wizard. Click “Finish” to complete the installation. At this point the HFI400 is installed and can be used with CONF401. For installation and usage procedures of CONF401, please refer to the CONF401 datasheet.



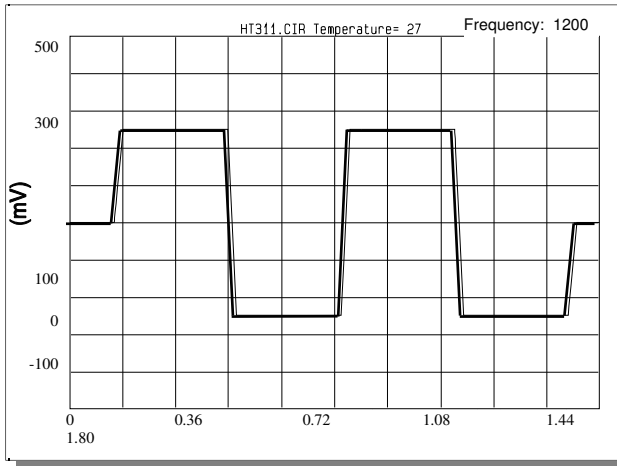
Connecting the HFI400 to the HART network:

Connect the coiled HART cable to the HFI400 via the RJ11 connector. The pinch probes can then be connected across the HART network as shown below. Communication requires a minimum load of 250 Ohms.

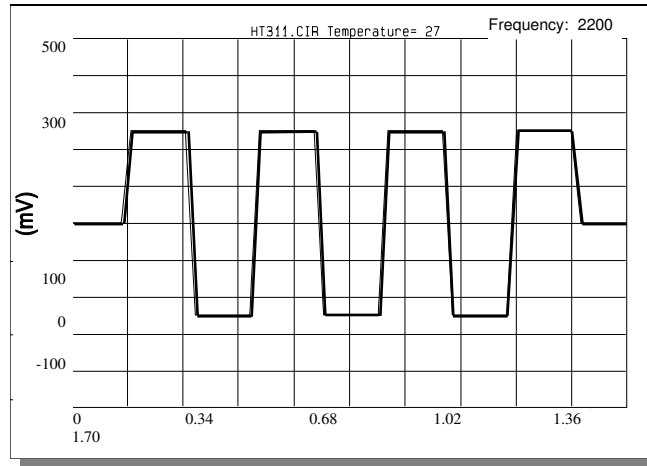


Signal Definitions

The figures below give the operating characteristics of the HART modulator at 1200 Hz and 2200 Hz as specified by the HART protocol.



1200 Hz



2200 Hz

Mechanical Specifications

Dimensions

Length: 3 ³/₄"
 Width: 1 ³/₈"
 Height: ³/₄"

Connections

To PC: USB Type B connector
 To HART Network: RJ11 connector for probe cable

Cable

Custom 5' Max. length, 2-wire RJ11 cable with 2 pinch connector probes
 USB 1.0 A/B Cable

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