SmarResearch
TechnologySource

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

HART Interface
For
IBM PC Compatibles
HI311

DataSheet

Features

- Supports most IBM PC Compatibles.
- Works with HART products from multiple manufacturers.
- System powered: no external power supply required
- Tested isolation of 1500V dc between the field instrument and EIA-RS232 adaptor pins.
- Plastic coiled cable wrap for easy installation and use
- Very low leakage (Max 10 $_{u}$A @ 35V dc) current to the process network.
- Standard DB9 serial port connector.

Functional Description

The HI 311HART Serial Interface provides a complete physical link between a HART® Field Instrument and any IBM compatible personal computer. The interface is fully self contained, and requires no direct power supply.

The HI 311 is designed for use with any software driver that meets the conditions shown in Table 1, or with SmarResearch's CONF 301 HART® Configuration Software.

The SMAR HI 311 provides a direct interface between a standard serial communication port on a personal computer and a HART® network. The HI 311 is compatible with HART® communication environments, and uses a minimum number of signals from the serial port.

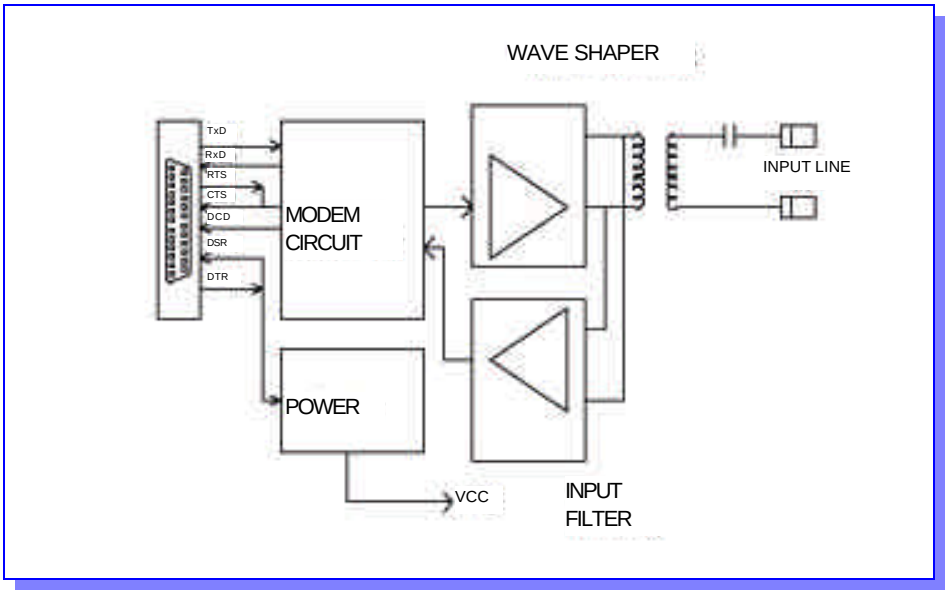

Figure 1 - Block Diagran

Signal Functions

TxD (pin #3)
TRANSMITTED DATA

- Computer output signal.
- HI 311 Input Signal.
- Defines serial data being transmitted.
- Nominal speed = 1200bps.

RxD (pin #2)
RECEIVED DATA

- HI 311 output signal.
- Computer input signal.
- Defines the serial data being detected at the HART® instrument line.
- Nominal speed = 1200bps.

RTS (pin #7)
REQUEST TO SEND

- Computer output signal.
- HI 311 Input Signal.
- Toggled by the computer to define the direction of data flow through the modem.

  RTS = TRUE: Modem is transmitting to the HART® instrument.
  RTS = FALSE: Modem is receiving from the HART® instrument.

CTS (pin #8)
CLEAR TO SEND

- HI 311 output signal.
- Computer input signal.
- Connected internally to the RTS line of the DB9 connector.

DSR (pin #6)
DATA SET READY

- HI 311 output signal.
- Computer input signal.
- Connected internally to the DTR line of the DB9 connector.

DCD (pin #1)
DATA CARRIER DETECTED

- HI 311 output signal.
- Computer input signal.
- Connected to the carrier detection signal from the modem.
- Will show TRUE when the modem detects frequency activity on the HART® instrument line.

DTR (pin #4)
DATA TERMINAL READY

- Computer output signal.
- HI 311 Input Signal.
- Primary source of power.
- To insure proper operation of the interface, it must be at V+ (state TRUE) at all times.
- When DTR goes to 0 Volts, power will be drawn from TxD and RTS.

GND (pin #5)
SIGNAL GROUND

- Connects the computer's ground wire to the ground wire of the HI 311.
- This ground signal is isolated from the HART® instrument line.
- Tested for a minimum isolation of 1500Vdc between the DB9 pins and the HART® line pins.

Signal Levels

The table below defines the signal levels that should be present at the computer's serial port for proper operation of the HI 311.

Pin numbers reference the HI 311's female DB9 connector.

DB9	V+ min	V- max	Z max	TRANSMITTING TO A HART LINE (FSK)	RECEIVING FROM HART LINE (FSK)
TxD (3)	5V	1V	3K	DATA OUT	DON'T CARE
RxD (2)	4V	1V	200	DON'T CARE	DATA IN
RTS (7)	5V	1V	3K	TRUE	FALSE
CTS (8)	....	....	....	=RTS=TRUE	=RTS=FALSE
DSR (6)	....	....	....	=DTR=TRUE	=DTR=TRUE
GND (5)	REF	REF	REF	DIRECT CONNECTION	DIRECT CONNECTION
DCD (1)	4V	1V	200	LINE ACTIVITY	LINE ACTIVITY
DTR (4)	8V	0V	200	TRUE (V+)	TRUE (V+)

Table 1 - Pin Signal Levels

Signal Definitions

Figures 2 and 3 below give the operating charecteristics of the HART modulator at 1200 Hz and 2200 Hz. Both were plotted using an HP digitizing oscilloscope connected to a 24Vdc power supply, a 250 Ohm shunt resistor, and a pressure transmitter.

Figure 4 shows the test circuit.

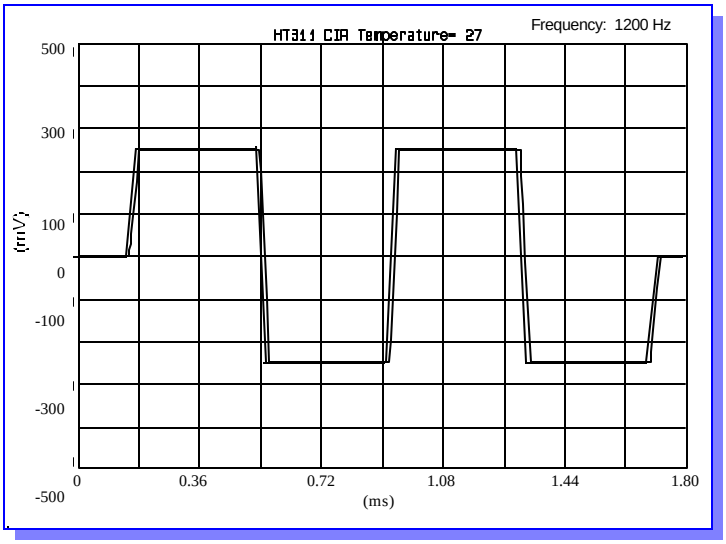

Figure 2 - 1200 Hz

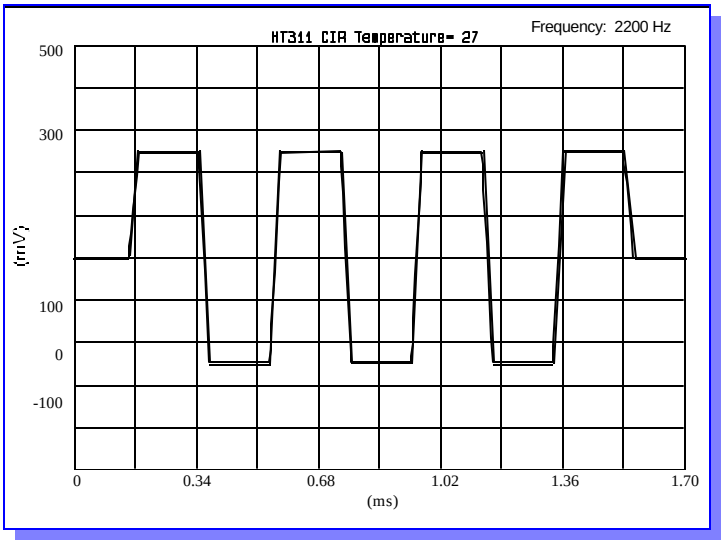

Figure 3 - 2400 Hz

Connection Example

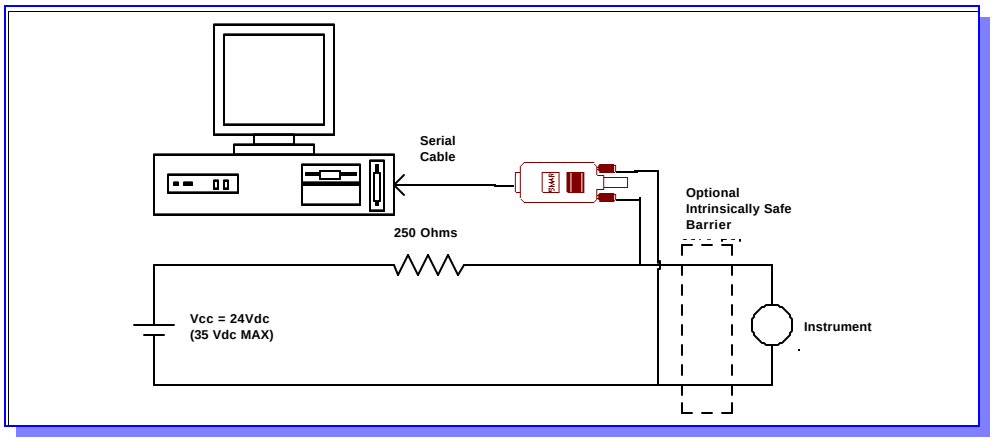

Figure 4 - Circuit Example

Mechanical Specifications

Dimensions

Length:	4.25”
Width:	1.25”
Depth:	0.75”

Connections

Computer:	DB((female)
HART Side:	Clamp Probes

Cable

5’ max. length (including probles) coiled.

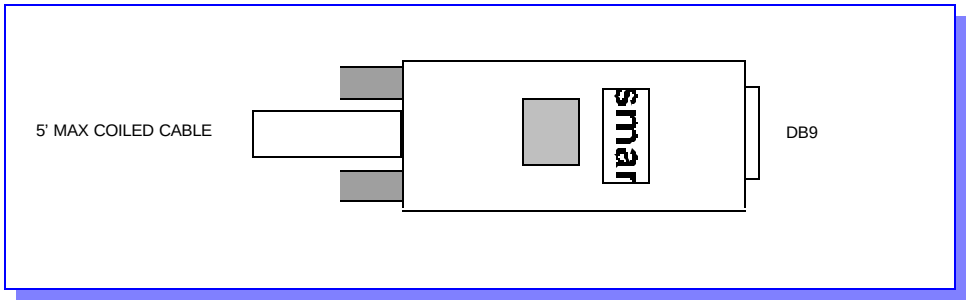

Figure 5 - Mechanical Specifications

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