Acuity
RESEARCH

AccuRange 4000™
PCI High Speed Interface Card
for Acuity® displacement sensors and line scanners
ISA and PC-104 interface cards also available

The AccuRange PCI High Speed Interface card

(PCI HSIF) takes samples from the AR4000 optical rangefinder and Line Scanner products. The AccuRange PCI HSIF can sample all sensor outputs at up to 50,000 times per second and buffer the data for reading by a host computer.

The PCI HSIF measures the duration of the pulse width output of the AR4000 sensor. The card permits sampling of signal strength, ambient light and sensor temperature. For maximum accuracy, calibration to obtain actual distance occurs on the host computer.

Technical Specifications

Form Factor	IBM-PC PCI bus, 4.7 x 3.7 in.
Power	+5V @ 500 mA
Sample Rate	200 - 50,000 samples/sec
Sample Format	16 byte
Range	32 bit
Encoders	two, 32 bit
Signal strength	8 bit
Ambient Light	8 bit
Sensor Temp.	8 bit
Buffer Size	64 Kbyte
Buffer Indicators	Empty, Half-full, Overflow & Half-full Interrupt
Software	PCI driver, DLL, Demo and Diagnostic programs
Operating System	Windows® 98, 2000 and XP

PCI HSIF Input and Output Connectors

9 Pin Power and Signal Connector (P1)

Pin	AR4000 wire	Function	Direction
1	Red	Power, +5V	out
2	Black	Ground	
3	Orange	Heater Pwr, +5V (4.5-7V)	out
4	Brown	Heater Pwr Retrun	
5	Yellow	Temp, 0-5V	in
6	Blue	Pulse Width Range Signal	in
7	Green	Ambient Light signal, 0-5V	in
8	Purple	Amplitude signal, 0-5V	in
9	Not used	Laser control, 0-5V	out

General Purpose Inputs

The PCI HSIF board has three general purpose inputs. Input lines 1 and 2 are latched high for one sample interval. The minimum pulse width is 50 ns. Input line 3 is not latching.

Motor Control

The PCI HSIF card comes with two variable voltage motor control outputs. A separate power supply is required to drive the motors.

Maximum drive power	0.5A at 15V
Power control resolution	1 part in 256

Encoder Reading

The PCI HSIF is equipped with two 32-bit motor encoder readers. The board can be designated with either single-ended or differential receivers. In both cases, the input stream is a 2-channel quadrature plus an index pulse. The output is 8-bit motor positions inserted in the sensor data stream.

Acuity
RESEARCH

25 Pin I/O Connector (P2)

For single ended encoders, unless marked for differential "dif"

Pin	Top Row Function	Direction
1	Motor 2 control	out
2	Motor 2 Return	out
3	Motor Power Supply	in
4	Ground	
5	+5V Power, 100mA	out
6	Ground	
	Motor 2 encoder Ch A- (dif)	in
7	Ground	
	Motor 2 encoder Ch B- (dif)	in
8	Ground	
	Motor 1 encoder Ch A- (dif)	in
10	Ground	
	Motor 1 encoder Ch B- (dif)	in
11	Gen. Purpose Input 2 / Encoder 2 index pulse - (dif)	in
12	Start/Stop sample control	in
13	Gen. Purpose Input 2 / Encoder 2 index pulse +	in

Pin	Bottom Row Function	Direction
14	Motor 1 control	out
15	Motor Power Ground	
16	Motor 1 Return	out
17	Laser Control	out
18	+5V Power, 100 mA	out
19	Motor 2 Encoder Ch A+	in
20	Motor 2 Encoder Ch B+	in
21	Motor 1 Encoder Ch A+	in
22	Motor 1 Encoder Ch B+	in
23	Gen. Purpose Input 1 / Encoder 1 index pulse -	in
24	Gen. Purpose Input 1 / Encoder 1 index pulse +(dif)	in
25	Gen. Purpose Input 3	in

Software Interface

The AccuRange 4000 PCI HSIF card application program interface employs routines accessed through the Acuity HSIF Dynamic Link Libraries (DLL's) and Windows drivers.

HsifOpen: Opens communications with the PCI HSIF card and returns its handle.

HsifClose: Closes the application's access to the card.

HsifGetSamples: Gets the data samples from the card. The data format is listed below.

HsifProcessSamples: Calculates range measurements using the samples received

HsifLoadCalibrationData: Loads the calibration data information for the AR4000 sensor to be used with *HsifProcessSamples* for generating true distance measurements.

Sampled Data Format

The sequential data stream into the PCI HSIF has a Sample size of 16 bytes/sample. The range sample is 32 bits. The data format is below.

Word	Bit #	Contents
0	0	buffer overflow indicator
	1	Input 3
	2	Motor 1 encoder index / Input 1
	3	Motor 2 encoder index / Input 2
	4-7	sample count, 0-15 repeating
	8-15	8-bit Sensor internal temperature
1	0-7	8-bit ambient light sample
	8-15	8-bit amplitude sample
2	0-15	32-bit Motor 1 encoder position low word
3	16-31	32-bit Motor 1 encoder position high word
4	0-15	32-bit Motor 2 encoder position low word
5	16-31	32-bit Motor 2 encoder position high word
6	0-15	32-bit range low word
7	16-31	32-bit range high word

Acuity Research

is the leader in laser sensor development. If our standard products do not exactly meet your needs, please call us with your requirements. We are happy to design a sensor to your range, accuracy and size constraints. Additionally, our products can be configured to a a variety of target sensing requirements.

3475 Edison Way, Unit P
Menlo Park, CA 94025
Tel: 650-369-6782 Fax: 650-369-6785
www.acuityresearch.com

www.instrumentation.it

INSTRUMENTATION DEVICES SRL

Via Acquanera 29, 22100 COMO (Italy) tel. +39.031.525391 - fax +39.031.507984 - info@instrumentation.it