



Microcom Design, Inc.

Sensor Interface SI-5



P/N: DL-105

Features

- 2 Mbytes standard memory
- I/O and RS-232 serial ports
- 13-bit analog to digital conversions
- 16-bit H8S Hitachi Microcontroller with 32-bit internal CPU architecture
- Temperature compensated real-time clock
- Single DAC used for excitation and measurements to give ratio metric measurements
- Gas Discharge Tube (GDT) protected inputs
- Data values stored in tables with a time stamp and record number
- Battery-backed SRAM memory and clock ensuring data, programs, and accurate time are maintained while disconnected from its main power source
- Measures intelligent serial sensors

Storage Capacity

1 Mbyte of FLASH memory for the Operating System.
2 Mbytes battery-backed SRAM for CPU usage, program storage, and data storage. Data is stored in a table format. Storage capacity can be increased by using a CompactFlash® card.

12 Vdc source; SI-5 typically uses a sealed rechargeable battery that can be float-charged with a solar panel or ac power.

Datalogger Programming

The onboard, BASIC-like programming language supports data processing and analysis routines. An intuitive GUI is provided for user interface.

Input Output Terminals

Analog Inputs: Eight differential (16 single-ended) channels measure voltage levels. Resolution on the most sensitive range is 0.67 μ V.

Pulse counters: Two pulse channels can count pulses from high level (5 V square wave), switch closure, or low level ac signals.

Switched voltage excitations: Three outputs provide precision excitation voltages for resistive bridge measurements.

Digital I/O ports: Eight ports are provided for frequency measurements, digital control, and triggering. Three of these ports can also be used to measure SDM devices.

Switched 12 Volt: This terminal provides unregulated 12 V that can be switched on and off under program control.

RS-232 port: A PC or laptop can be connected to this 9-pin port via an RS-232 cable.

I/O port: Data transfer peripherals that require power from the datalogger can be connected to this port via a cable.

Peripheral Port: One 40-pin port interfaces with the CompactFlash® module.

Operational Temperature: -25° to +50°C; an extended range of -55° to +85°C is available.

Communications

Compatible telecommunication options include Ethernet, phone modems (land-line and cellular), radios, short haul modems, GTX-1.0 GOES satellite transmitter, and multidrop modems. Real-time and historical data can be displayed on-site using a Palm OS-based PDA (requires PConnect 3.1), or a PC. The PC connects to the SI-5 via an RS-232 cable, or if optical isolation is required, via the I/O port and SC32B interface. Customers can transport programs/data to a PC via CompactFlash® cards.

Channel Expansion

Synchronous Devices for Measurement (SDMs) are addressable peripherals that expand the SI-5's measurement and control capabilities. For example, SDMs are available to add control ports, analog outputs, pulse count channels, interval timers, or even a CANbus interface to a system. Multiple SDMs, in any combination, can be connected to one SI-5 datalogger.

Multiplexers

Multiplexers increase the number of sensors that can be measured by a SI-5 by sequentially connecting each sensor to the datalogger. Several multiplexers can be controlled by a single SI-5. The SI-5 is compatible with the AM16/32 and AM25T.

Microcom Design, Inc.

10948 Beaver Dam Road
Hunt Valley, MD, USA 21030
Tel: (410) 771-1070
Fax: (410) 771-0018

E-mail: sales@microcomdesign.com

Microcom Design Inc.

656-E Capital Circle, NE
Tallahassee, FL, USA 32301
Tel: (850) 325-1865

Email: sales@microcomdesign.com

Microcom Canada

Omnimatrix
3465 Ashby
Saint Laurent, QC H4R 2K3
Tel: (514) 684 1004
Fax: (514) 697 0400

Email: roger@omnimatrix.com

Microcom Brazil

Simtech Representacoes LTDA
Rua do Mercado 17/14 andar Centro
Rio de Janeiro, Brazil CEP 20010-120
Tel: 21 2506 5900
Fax: 21 2240 1242

E-mail: simtech@simtech.com.br



Microcom Design, Inc.

Sensor Interface

Specifications

ANALOG INPUTS

8 differential or 16 single-ended individually configured. Channel expansion provided by AM16/32 and AM25T multiplexers.

ACCURACY: $\pm(0.07\%$ of reading + offset), 0° to 40°C; $\pm(0.14\%$ of reading + offset), -25° to 50°C

INPUT VOLTAGE: ± 16 Vdc max.

INPUT CURRENT: ± 1 nA typical, ± 6 nA max. @ 50°C; ± 90 nA @ 85°C

INPUT RESISTANCE: 20 Gohms typical

ACCURACY OF BUILT-IN REFERENCE JUNCTION THERMISTOR (for thermocouple measurements): $\pm 0.3^\circ\text{C}$, -25° to 50°C

ANALOG OUTPUTS: 3 switched voltage, active only during measurement, one at a time.

RANGE & RESOLUTION: Voltage outputs programmable between ± 2.5 V with 0.67 mV resolution.

ACCURACY: $\pm(0.07\%$ of setting + 0.8 mV), 0° to 40°C; $\pm(0.14\%$ of setting + 0.8 mV), -25° to 50°C

CURRENT SOURCING/SINKING: ± 25 mA

RESISTANCE MEASUREMENTS

MEASUREMENT TYPES: The SI-5 provides ratiometric measurements of 4- and 6-wire full bridges, and 2-, 3-, and 4-wire half bridges. Precise, dual polarity excitation using any of the 3 switched voltage excitations eliminates DC errors.

RATIO ACCURACY: Assuming excitation voltage of at least 1000 mV, not including bridge resistor error: $\pm(0.04\%$ of reading + Offset/V_{ex})

PULSE COUNTERS

Two 24-bit inputs selectable for switch closure, high frequency pulse, or low-level ac.

MAXIMUM COUNTS PER SCAN: 16.7x10⁶

SWITCH CLOSURE MODE:

Minimum Switch Closed Time: 5 ms

Minimum Switch Open Time: 6 ms

Max. Bounce Time: 1 ms open w/o being counted

HIGH FREQUENCY PULSE MODE:

Maximum Input Frequency: 250 kHz

Maximum Input Voltage: ± 20 V

Voltage Thresholds: Count upon transition from below 0.9 V to above 2.2 V after input filter with 1.2 μs time constant.

LOW LEVEL AC MODE: Internal ac coupling removes dc offsets up to ± 0.5 V.

Input Hysteresis: 16 mV @ 1 Hz

Maximum ac Input Voltage: ± 20 V

Minimum ac Input Voltage: Sine wave (mV RMS) Range (Hz) 20 - 1.0 to 20 up to 5000 - 0.3 to 20,000

DIGITAL I/O PORTS

8 ports software selectable, as binary inputs or control outputs. C1-C8 also provide edge timing, subroutine interrupts/wake up, switch closure pulse counting, high frequency pulse counting, asynchronous communications (UART), SDI-12 communications, and SDM communications.

HIGH FREQUENCY MAX: 400 kHz

SWITCH CLOSURE FREQUENCY MAX: 150 Hz

OUTPUT VOLTAGES (no load): high 5.0 V ± 0.1 V; low < 0.1

OUTPUT RESISTANCE: 330 ohms

INPUT STATE: high 3.8 to 5.3 V; low -0.3 to 1.2 V

INPUT HYSTERESIS: 1.4 V

INPUT RESISTANCE: 100 kohms

SDI-12 INTERFACE SUPPORT

Control ports 1, 3, 5, and 7 may be configured for SDI-12 asynchronous communications. Up to ten SDI-12 sensors are supported per port. Meets SDI-12 Standard ver 1.3 for datalogger mode.

CE COMPLIANCE

STANDARD(S) TO WHICH CONFORMITY IS DECLARED: BS EN61326:2002

CPU & INTERFACE

PROCESSOR: Hitachi H8S 2322 (16-bit CPU with 32-bit internal core)

MEMORY: Battery-backed SRAM; 2 Mbytes, 16 kbytes for program storage

SERIAL INTERFACES

COM1 (I/O, used to interface with peripherals),

COM2 (standard RS-232 communication port)

PARALLEL INTERFACE: 40-pin interface for attaching data storage or communication peripherals such as the CFM100 module

BAUD RATES: Selectable from 300 to 115.2 kbps. ASCII protocol is one start bit, one stop bit, eight data bits, and no parity.

CLOCK ACCURACY: ± 3 min. per year (-30° to 85°C);

SYSTEM POWER REQUIREMENTS

VOLTAGE: 9.6 to 16 Vdc

TYPICAL CURRENT DRAIN: Sleep Mode: ~ 0.5 mA up to < 7 mA w/RS-232 communications and 100 Hz Sample Rate (one fast SE meas.)

EXTERNAL BATTERIES: 12 Vdc nominal; reverse polarity protected.

PHYSICAL SPECIFICATIONS

Dimensions: 9.4" x 4" x 2.4" (23.9 x 10.2 x 6.1 cm)

WEIGHT: 2.1 lbs (1 kg)

WARRANTY: Three years against defects in materials and workmanship.



SI-5 with
GTX-1.0
Satellite
Transmitter