IMP-850 DATA ACQUISITION SYSTEM

FEATURES

- **Direct Sensor Inputs**
- **Control Outputs**
- **Built-In Keyboard/Display**
- **Optically Isolated RS-232C Port**
- **Internal/External Solid-State Storage**
- **Phone/Dedicated Line or Radio Telemetry**
- **Low Power**
- **Built-In Surge Protection**

The IMP-850 is a versatile digital data acquisition system suitable for environmental monitoring applications. It can function as a stand-alone station or be operated via a computer singly or in a network.

Direct sensor interface including the supply of excitation voltages is possible with the IMP-850. The input signals will then be processed as required. Data will either be stored in internal memory, a removable solid-state storage module, or a remote computer for later processing. The solid-state storage module can be used to transport and download a new operating program.

User programming of the IMP-850 is easily accomplished via an IBM PC-compatible computer with support software or an optional, portable keyboard/display unit. A comprehensive on board instruction set is included which can be programmed to perform calculations on any desired channel including interactions between channels. A custom operating program is factory supplied and can be modified by the user.

The basic IMP-850 (P/N 101484-G0-H0) consists of a P/N 101633 data logger mounted in a 18 x 16 x 8 inch, NEMA-4X enclosure with 1Mbytes of internal memory capable of storing up to 500,000 final data points. The G1 option provides an enclosure size of 24 x 24 x 8 inches and the H1 option adds 4 Mbyte of internal memory. A rack mountable version of the IMP-850 is also available (P/N 101659-G0-H0).

The IMP-850 requires a 12-volt DC power source such as our 8AH battery backup power (P/N 101139). When battery backup is not required, our P/N 100520-G0-H1 power supply is provided.

A large selection of communications, storage, measurement and control peripherals are available. Please contact Climatronics for a system quotation based on your specific requirements.

SPECIFICATIONS

Electrical specifications are valid over a -25° to +50°C range unless otherwise specified; non-condensing environment required. To maintain electrical specifications, yearly calibrations are recommended.

PROGRAM EXECUTION RATE
Program is synchronized with real-time up to 100 Hz. Two fast (250 µs integration) measurements can write to final storage at 100 Hz. Burst measurements up to 1.5 kHz are possible over short intervals.

ANALOG INPUTS
NUMBER OF CHANNELS: 12 differential or 24 single-ended, individually configured. Channel expansion provided by CAM416 Relay Multiplexers and CAM25T Thermocouple Multiplexers.

ACCURACY: ±0.025% of FSR; 0° to 40°C ±0.05% of FSR; -25°to 50°C ±0.075% of FSR; -40° to80°C (optional)

RANGES AND RESOLUTION:

Full Scale Input Range (mV)	Resolution (µV) Differential	Single-Ended	Accuracy
±5000	166	333	±5.00
±1000	33.3	66.6	±1.00
±200	6.66	3.33	±0.20
±50	1.67	3.33	±0.05
±10	0.33	0.66	±0.01

INPUT SAMPLE RATES: Includes the measurement time and conversion to engineering units. Differential measurements incorporate two integrations with reversed input polarities to reduce thermal offset and common mode errors. Fast measurement integrates the signal for 250 µs; slow measurement integrates for one power line cycle.

Fast single-ended voltage:	2.1 ms
Fast differential voltage:	3.1 ms
Slow single-ended voltage (60 Hz):	18.3 ms
Slow differential voltage (60 Hz):	35.9 ms
Fast differential thermocouple:	6.9 ms

INPUT REFERRED NOISE: typical for ±10mV input range; digital resolution dominates for higher ranges

Fast differential:	0.60 µV rms
Slow differential (60 Hz):	0.15 µV rms
Fast single ended:	1.20 µV rms
Slow Single-ended:	0.30 µV rms

COMMON MODE RANGE: ±5.0 V

DC COMMON MODE REJECTION: >100 dB

NORMAL MODE REJECTION: 70 dB (60 Hz with slow differential measurement)

INPUT CURRENT: ±2.5 nA typ; ±10 nA maximum

INPUT RESISTANCE: 20 Gohms typical

ANALOG OUTPUTS
DESCRIPTION: 4 switched, active only during measurement, one at a time; 2 continuous

RANGE: Programmable between ±5 V

RESOLUTION: 0.333 mV

ACCURACY: ±5 mV; ±2.5 mV (0° to 40°C);

CURRENT SOURCING: 50 mA for switched; 15 mA for continuous

CURRENT SINKING: 50 mA for switched; 5 mA for continuous (15 mA for continuous with Boost selected in P133)

FREQUENCY SWEEP FUNCTION: The switched outputs provide a programmable swept frequency, 0 to 5 V square wave for exciting vibrating wire transducers.

RESISTANCE MEASUREMENTS
MEASUREMENT TYPES: The IMP-850 provides ratiometric bridge measurements of 4- and 6-wire full bridges, and 2-, 3-, and 4-wire half bridges. Precise dual polarity excitation using any of the switched outputs eliminates DC errors. Conductivity measurements use a dual polarity 0.75 ms excitation to minimize polarization errors.

ACCURACY: ±0.02% of FSR plus bridge resistor error.

PERIOD AVERAGING MEASUREMENTS
DEFINITION: The average period for a single cycle is determined by measuring the duration of a specified number of cycles. Any of the 24 single-ended analog input channels can be used. Signal attenuation and AC coupling are typically required.

INPUT FREQUENCY RANGE: Signals centered around data logger ground

Min. Signal Peak-to-Peak	Max Input Freq.
500 mV	200 kHz
10 mV	30 kHz
5 mV	20 kHz
2 mV	10 kHz

RESOLUTION: 12 ns divided by the number of cycles measured

ACCURACY: ±0.03% of reading

PULSE COUNTERS
NUMBER OF PULSE COUNTER CHANNELS: 4 eight-bit or 2 sixteen-bit; software selectable as switch closure, high frequency pulse, and low level AC. Counters read at 10 or 100 Hz.

MAXIMUM COUNT RATE: 2.5 kHz and 25 kHz, eight-bit counter read at 10 Hz and 100 Hz, respectively. 500 kHz, sixteen-bit counter.

SWITCH CLOSURE MODE
Minimum Switch Closed Time: 5 ms
Minimum Switch Open Time: 6 ms
Maximum Bounce Time: 1 ms open without being counted

HIGH FREQUENCY PULSE MODE
Minimum Pulse Width: 1.0 µs
Maximum Input Frequency: 500 kHz
Voltage Thresholds: Count upon transition from below 1.5 V to above 3.5 V at low frequencies. Larger transitions are required at high frequencies because of input filter with 0.5 µs time constant filter.
Maximum Input Voltage: ±20 V

LOW LEVEL AC MODE
Internal AC coupling removes DC offsets up to ±0.5 V
Input Hysteresis: 15 mV
Maximum AC Input Voltage: ±20 V

Min. Sine wave RMS	Frequency Range
20 mV	1 Hz to 1 kHz
200 mV	0.5 Hz to 10 kHz
1000 mV	0.3 Hz to 16 kHz

DIGITAL I/O PORTS
8 ports, software selectable as binary inputs or control outputs. Four ports can be configured to count switch closures and high frequency.

HIGH FREQUENCY MAX: 2.5 kHz

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

OUTPUT RESISTANCE: 500 ohms

INPUT STATE: high 3.0 to 5.5 V; low -0.5 to 0.8 V

INPUT RESISTANCE: 100 kohms

SDI-12 INTERFACE STANDARD
DESCRIPTION: Digital I/O Ports C5-C8 support SDI-12 asynchronous communication; up to ten SDI-12 sensors can be connected to each port. Meets SDI-12 Standard version 1.2 for data logger and sensor modes.

EMI and ESD PROTECTION
Encased in metal with gas discharge tubes on the panel, the IMP-850 has EMI filtering and ESD protection on all input and output connections.

CE COMPLIANCE (as of 01/98)
APPLICATION OF COUNCIL DIRECTIVE (S): 89/336/EEC as amended by 89/336/EEC and 93/68/EEC

STANDARD (S) TO WHICH CONFORMITY IS DECLARED:
ENC55022-1: 1995 and ENC50082-1: 1992

CPU AND INTERFACE
PROCESSOR: Hitachi 6303; Motorola 68HC708 supports communications.

MEMORY: 1M Flash stores 500K data values; 512 Flash stores OS and user programs, with 128K battery-backed SRAM. Optional 4M Flash available.

DISPLAY: 24-character-by-2-line LCD.

SERIAL INTERFACES: Optically-isolated RS-232C 9-pin interface for computer or modem. Additional 9-pin I/O interface for peripherals such as card storage module or modem.

BAUD RATES: Selectable at 300, 1200, 2400, 4800, 9600, 19.2K, 38.4K, and 76.8K. ASCII protocol is one start bit, one stop bit, eight data bits (no parity).

SYSTEM POWER REQUIREMENTS
VOLTAGE: 11 to 16 Vdc

TYPICAL CURRENT DRAIN: 2 mA quiescent with display off (2.5 mA max), 7 mA quiescent with display on. 45 mA during processing, and 70 mA during analog measurement.

INTERNAL BATTERIES: 7 Ahr alkaline or 7 Ahr rechargeable base; low profile base without batteries optional. Several other power supply options are available. 1800 mAhr lithium battery for clock and SRAM backup typically provides 10 years of service.

PHYSICAL SPECIFICATIONS
SIZE: 9.5" x 7.0" x 3.8" (24.1 cm x 17.8 cm x 9.6 cm) Terminal strips extend 0.4" (1.0 cm) and terminal strip cover extends 1.3" (3.3 cm) above the panel surface.

WEIGHT:	3.6 lbs (1.6 kg) with low-profile base
	8.3 lbs (3.8 kg) with alkaline base
	10.7 lbs (4.8 kg) with rechargeable base

WARRANTY
Three years against defects in materials and workmanship.