



IMP-855 DATA ACQUISITION SYSTEM

FEATURES:

- **Direct Sensor Inputs & Control Outputs**
- **28 Single Ended Inputs, 16-bit A/D**
- **Built-in Keyboard & 128x64 LCD 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-855 is a versatile digital data acquisition system designed 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-855. The input signals are processed by a custom application program that is factory supplied and may be modified by the user. Data will either be stored in internal memory, a removable CompactFlash® card, or a remote computer for later processing. The CompactFlash® card can be used to transport and download a new application program.

User programming of the IMP-855 is easily accomplished via an IBM PC-compatible computer with the logger support software. A comprehensive on board instruction set is included which can be programmed to perform calculations on any desired channel including interactions between channels.

The basic IMP-855 (P/N 102710-G1-H0) consists of a data logger mounted in a 18 x 16 x 8 inch, NEMA-4X enclosure with 4Mbytes of internal memory capable of storing up to 2M final data points. A CompactFlash® card interface is available to increase the data storage capacity. The G2 option provides an enclosure size of 24 x 24 x 8 inches. A rack mountable version of the IMP-855 is also available (P/N 102711-G0-H0).

The IMP-855 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; (-40° to 85°C, optional) non-condensing environment required. To maintain electrical specifications, yearly calibrations are recommended.

ANALOG INPUTS (SE1-SE28 or DIF1-DIF14)

NUMBER OF CHANNELS: 14 differential or 28 single-ended, individually configured. Ratiometric resistive bridge, thermocouple and period average (frequency) measurements are also supported on allanalog input channels. Channel expansion provided by AM16/32 and AM25T Multiplexers.

RANGES AND RESOLUTION: 16-bit basic resolution (Basic Res) Resolution of DF measurements with input reversal is half the Basic Res (17 bits).

Input Range (mV) ¹	DF Res (mV) ²	Single-Ended
±5000	83.33	167
±1000	33.3	16.67
±200	3.33	6.67
±50	0.83	1.67
±20	0.33	0.67

¹Range overhead of ~9% exists on all ranges to guarantee that the full-scale range values will not cause overrange.
²Resolution of DF measurements with input reversal

ACCURACY³:

±0.04% of FSR + offset; 0° to 40°C
±0.07% of FSR + offset; -25° to 50°C
±0.09% of FSR + offset; -40° to 85°C (-XT only)
³Accuracy does not include sensor and measurement noise. Offsets are defined as:

Offset for DF w/input reversal = 1.5 Basic Res + 1.0 μV
Offset for DF w/o input reversal = 3 Basic Res + 2.0 μV
Offset for SE = 3 Basic Res + 5.0 μV

MEASUREMENT SPEED: Time includes 250 μs for conversion to engineering units. For voltage measurements, the IMP 855 integrates the signal.

Integration Type	Integration Time	Settling Time	Measured Standard	Total Time Input Rev.
250	250 μs	200 μs	~0.7 ms	~ 1.4 ms
60 Hz filter	16.67 ms	3 ms	~20 ms	~ 40 ms
50 Hz filter	20.00 ms	3 ms	~23 ms	~ 46 ms

INPUT NOISE VOLTAGE: For DF measurements with input reversal on ±20mV input range; digital resolution dominates for higher ranges
250 μs Integration: 0.40 μV rms
50/60 Hz Integration: 0.19 μV rms

COMMON MODE RANGE: ±5.0 V
DC COMMON MODE REJECTION: >100 dB
NORMAL MODE REJECTION: 70 dB @ 60 Hz when using 60 Hz rejection

SUSTAIN INPUT VOLTAGE W/O DAMAGE:
±16 Vdc max.

INPUT CURRENT: ±1 nA typ; ±6 nA maximum @ 50° C; ±120 nA @ 85° C

INPUT RESISTANCE: 20 Gohms typical
ACCURACY OF BUILT-IN REFERENCE JUNCTION THERMISTOR (for thermocouple measurements): ±0.3°C, -25 to 50°C
±0.8°C, -40 to 85°C (-XT only)

PERIOD AVERAGING MEASUREMENTS

Any of the 28 SE single-ended analog input channels can be used for period averaging. Accuracy is ±(0.01% of reading + resolution) where resolution is 96 ns divided by the specified number of cycles to be measured.

Input Amplitude & Frequency

Volt Gain	Range Code	Signal (peak to peak) Min (mV) Max (V) ⁴	Pulse W Min. us	Max. Freq (kHz) ⁵
1	mV1000	200 10	2.5	200
5	mV200	20 2	5.0	100
20	mV50	5 2	10.0	50
50	mV20	2 2	25.0	20

⁴Maximum signal must be centered at data logger ground
⁵Assuming 50% duty cycle

ANALOG OUTPUTS (Vx1-Vx4, Ix1-Ix3, CAO1, CAO2)

4 switched voltage and 3 switched current outputs for ratiometric sensor/bridge excitation and 2 continuous voltage outputs. Switched outputs active only during measurement, one at a time.

	Range	Res	Current Source/Sink	Compliance Voltage
Vx:	±5 V	0.17 mV	±50 mA	N/A
CAO:	±5 V	0.17 mV	±15 mA	N/A
Ix:	±2.5 mA	0.08 μA	N/A	N/A

Vx & CAO ACCURACY:

±(0.04% of setting + 0.5 mV) 0° to 40°C
±(0.07% of setting + 0.5 mV) -25° to 50°C
±(0.09% of setting + 0.5 mV) -40° to 85°C (-XT only)

Ix ACCURACY:

±(0.1% of setting + 0.5 μA) 0° to 40°C
±(0.13% of setting + 0.5 μA) -25° to 50°C
±(0.15% of setting + 0.5 μA) -40° to 85°C (-XT only)

Vx 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-855 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. Offset values are reduced by a factor of 2 when excitation reversal is used.

VOLTAGE RATIO ACCURACY¹: Assuming excitation voltage of at least 500 mV, and not including bridge resistor errors

±(0.02% of voltage reading+offset)/V_x, 0° to 40°C
±(0.025% of voltage reading+offset)/V_x, -25° to 50°C
±(0.03% of voltage reading+offset)/V_x, -40° to 85°C

¹Accuracy does not include sensor and measurement noise. Offsets are defined as:

Offset for DF w/input reversal = 1.5-Basic Res + 1.0 μV
Offset for DF w/o input reversal = 3 Basic Res + 2.0 μV
Offset for SE = 3 Basic Res + 5.0 μV

ACCURACY WITH CURRENT EXCITATION¹: Assuming excitation current of at least 500μA.

±(0.02% of voltage reading+offset)/I_x, 0° to 40°C
±(0.025% of voltage reading+offset)/I_x, -25° to 50°C
±(0.03% of voltage reading+offset)/I_x, -40° to 85°C

¹Accuracy does not include sensor and measurement noise. Offsets are defined as:

Offset for DF w/input reversal = 1.5-Basic Res + 1.0 μV
Offset for DF w/o input reversal = 3 Basic Res + 2.0 μV
Offset for SE = 3 Basic Res + 5.0 μV

DEDICATED PULSE COUNTERS (P1 – P4)

Four inputs individually selectable for switch closure, high frequency pulse, or low level AC. Independent 24-bit counters (16.8 x 10⁶ counts) for each input.

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

Voltage Thresholds: Count upon transition from below 0.9 V to above 2.2 V after input filter with 1.2 μs time constant.
Maximum Input Voltage: ±20 V
Maximum Input Frequency: 250 kHz

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

Min. Sine wave RMS	Frequency Range
20 mV	1 Hz to 20 Hz
200 mV	0.5 Hz to 200Hz
2000 mV	0.3 Hz to 10 kHz
5000 mV	0.3 Hz to 20 kHz

DIGITAL CONTROL PORTS (C1-C8, SDM)

8 digital control ports (C1 – C8) having multiple function capability including digital control outputs, digital control interrupts, pulse counting, switch closure, frequency/period measurements, edge timing, and SDI-12 communications. Independent asynchronous communications ports (UARTs) paired on control port pairs C1-C2, C3-C4, C5-C6 and C7-C8 resulting in four independent Tx/Rx pair for serial sensors.

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

HIGH FREQUENCY MAX: 400 kHz

SWITCH CLOSURE FREQUENCY MAX: 150 Hz

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

OUTPUT RESISTANCE: 330 ohms

ADDITIONAL DIGITAL PORTS: SDM-C1, SDM-C2, SDM-C3 are dedicated for measuring SDM devices

SWITCHED 12 V (SV12V)

Two independent 12 V unregulated sources switched on and off under program control. Thermal fuse hold current = 900 mA @ 20°C, 650 mA @ 50°C, 360 mA @ 85°C.

CE COMPLIANCE

STANDARD (S) TO WHICH CONFORMITY IS DECLARED: IEC61326:2002

COMMUNICATIONS

RS-232 PORTS:

9-pin: DCE (electrically isolated) for computer or non-CSI modem connection

COM1 to COM4: Four independent Tx/Rx pairs on control ports (non-isolated)

Baud Rate: Selectable from 300 to 115.2 kbps.

Format: 7,8 data bits; 1, 2 stop bits; odd, even, or no parity

CS I/O PORT: Interface with CSI peripherals

SDI-12: Digital I/O Ports 1,3,5 and 7 support SDI-12 asynchronous communication; up to ten SDI-12 sensors can be connected to each port. Meets SDI-12 Standard version 1.3 for data logger mode.

SDM PORT: Interface with CSI Synchronous Devices for Measurement

PERIPHERAL PORT: Interface with CFM100 CompactFlash Module

SYSTEM

PROGRAM EXECUTION INTERVALS: 10 ms to 30 min. @ 10 ms increments

PROCESSOR: Renesas H8S 2674 (16-bit CPU with 32-bit internal core).

MEMORY: 2Mbytes of Flash for operating system; 4 Mbytes of battery-backed SRAM for CPU usage, program storage and data storage.

DISPLAY: 128 X 64 character backlit LCD.

CLOCK ACCURACY: ±3 min. per year

SYSTEM POWER REQUIREMENTS

VOLTAGE: 11 to 16 Vdc
TYPICAL CURRENT DRAIN: Sleep mode 2 mA, 1 Hz sample rate (one fast SE meas.); 3 mA 100 Hz sample rate (one fast SE meas.); 10 mA 100 Hz sample rate (one fast SE meas. w/RS-232 communications); 38 mA Display on: add 1 mA to current drain Backlight on: add 42 mA to current drain

INTERNAL BATTERIES: 10 Ahr alkaline or 7 Ahr rechargeable base; low profile base without batteries optional. 1200 mAhr lithium battery for clock and SRAM backup typically provides 3 years of service.

EXTERNAL BATTERIES: 12 VDC nominal; reverse polarity protected

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 0.875" (2.2 cm) and terminal strip cover extends 1.575" (4.0 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.

TEL: 631-567-7300
FAX: 631-567-7585
E-Mail: sales@climatronics.com



Climatronics Corporation
140 Wilbur Place
Bohemia, NY 11716-2404