

Specifications

The following electrical specifications are valid for an ambient temperature range of -25 to +50°C unless otherwise specified.

PROGRAM EXECUTION RATE

System tasks initiated in sync with real time up to 80 Hz. One measurement with data transfer is possible at this rate without interruption. A single input may be measured over short intervals at rates up to 1030 Hz using Burst Measurement.

ANALOG INPUTS

NUMBER OF CHANNELS: 8 differential or up to 16 single-ended. Each differential channel can be configured as two single-ended channels.

CHANNEL EXPANSION: Model AM416 Relay Multiplexer allows an additional 64 single-ended channels to multiplex into four 21X single-ended channels. Model AM25T allows an additional 25 differential channels to multiplex into a single 21X differential channel.

RANGE AND RESOLUTION: Ranges are software selectable for any channel. Resolution for a single-ended measurement is twice the value shown.

Full Scale Range (FSR)	Resolution
± 5000 millivolts	333 microvolts
± 500 millivolts	33.3 microvolts
± 50 millivolts	3.33 microvolts
± 15 millivolts	1.00 microvolt
± 5 millivolts	0.33 microvolts

ACCURACY OF VOLTAGE MEASUREMENTS AND ANALOG OUTPUT VOLTAGES:

Differential and positive single-ended:
±0.05% FSR (±0.025%, 0 to 40°C)
(e.g., ±0.05% FSR = ±5 mV for ±5000 mV range)

Negative single-ended:
±0.15% FSR (±0.1%, 0 to 40°C)

INPUT SAMPLE RATES: The fast A/D conversion uses a 0.25 ms signal integration time and the slow conversion uses a 16.666 ms signal integration (one power line cycle period). Differential measurements include a second sampling with reversed input polarity to reduce thermal offset and common mode errors. Input sample rates are the time required to measure and convert the result to engineering units.

Fast single-ended voltage:	2.4 ms
Fast differential voltage:	3.7 ms
Slow single-ended voltage:	18.8 ms
Slow differential voltage:	37.0 ms
Fast differential thermocouple:	7.3 ms

INPUT NOISE VOLTAGE:

Fast differential	---	0.82 microvolts RMS
Slow differential	---	0.1 microvolts RMS

COMMON MODE RANGE: ± 5 volts

DC COMMON MODE REJECTION: > 140 dB

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

INPUT CURRENT: 2 nanoamps maximum

INPUT RESISTANCE: 200 gigohms

SUSTAINED INPUT VOLTAGE WITHOUT DAMAGE: < ± 16 VDC

ANALOG OUTPUTS

NUMBER OF ANALOG OUTPUTS: 4 switched, 2 continuous

DESCRIPTION: A switched output is active only during a measurement and is switched off (high impedance) immediately following the measurement. Only one switched output can be active at a time. The 2 continuous outputs hold a preset voltage until updated by an analog output command.

RANGE: ± 5 volts

RESOLUTION: 0.67 millivolts

ACCURACY: Same as voltage input.

OUTPUT CURRENT:

Switched: 20 mA @ ± 5 V, 50 mA @ ± 2.5 V
Continuous: same @ +V, 5 mA @ -V

RESISTANCE AND CONDUCTIVITY MEASUREMENTS

ACCURACY: 0.0175% (±0.01%, 0 to 40°C) of full scale bridge output, limited by the matching bridge resistors. The excitation voltage should be programmed so the bridge output matches the full scale input voltage range.

MEASUREMENT TYPES: 6-wire and 4-wire full bridge, 4-wire, 3-wire, and 2-wire half bridge. Bridge measurements are ratiometric and dual polarity to eliminate thermal emfs. AC resistance measurements use a dual polarity 0.75 ms excitation pulse for ionic depolarization, with the signal integration occurring over the last 0.25 ms.

PULSE COUNTERS

NUMBER OF PULSE COUNTER CHANNELS: 4 eight-bit or 2 sixteen-bit; software selectable.

MAXIMUM COUNT RATE: 2550 Hz, eight-bit counter; 250 kHz, sixteen-bit counter. Pulse counter channels are scanned at 10 Hz maximum.

MODES: Switch closure, high frequency pulse, and low level AC:

SWITCH CLOSURE MODE

Minimum Switch Closed Time: 3 milliseconds
Minimum Switch Open Time: 4 milliseconds
Maximum Bounce Time: 1 millisecond open without being counted.

HIGH FREQUENCY PULSE MODE

Minimum Pulse Width: 0.002 milliseconds
Maximum Input Frequency: 250 kHz
Voltage Thresholds: Count upon transition from below 1.5 V to above 3.5 V
Maximum Input Voltage: ± 20 V

LOW LEVEL AC MODE

(Typical of magnetic pulse flow transducers or other low voltage, sine wave outputs).
Input Hysteresis: 11 mV
Maximum AC Input Voltage: 20 V RMS

Frequency Range:

Minimum AC Input (RMS)	Range
20 mV	1 Hz to 100 Hz
50 mV	0.5 Hz to 400 Hz
150 mV to 20 V	0.3 Hz to 1000 Hz

(Consult factory if higher frequencies are desired.)

DIGITAL CONTROL OUTPUTS

NUMBER OF DIGITAL CONTROL OUTPUTS: 6
(can be set or reset on command)

OUTPUT VOLTAGES (no load): high 5 volts
± 0.1 volt; low < 0.1 volt

OUTPUT RESISTANCE: 400 Ω

TRANSIENT PROTECTION

All input and output connections are protected using spark gaps connected directly to a heavy copper bar on the circuit card between the two input terminal strips. The 12 volt power input and charger inputs are protected with transzors.

CPU AND INTERFACE

PROCESSOR: Hitachi 6303

MEMORY: 24K ROM, 40K RAM. Standard 21X stores 19,296 low resolution data points in Final Memory.

DISPLAY: 8 digit LCD (0.5" digits)

PERIPHERAL INTERFACE: 9 pin D-type connector for storage module, modem, printer, card storage module, and RS-232 adapter. Baud rates selectable at 300, 1200, 9600 and 76,800.

CLOCK ACCURACY: ± 1 minute per month; clock slows by up to 2 minutes per month with continuous operation at temperature extremes.

SYSTEM POWER REQUIREMENTS

VOLTAGE: 9.6 to 15 volts

TYPICAL CURRENT DRAIN: 1.0 mA quiescent, 25 mA during processing, and 60 mA during analog measurement.

INTERNAL BATTERIES: The 21X is powered by 8 Alkaline "D" cells with 7 Ahr capacity. The 21XL's sealed rechargeable batteries have 2.5 Ahr capacity per charge. The 21XL batteries are recharged from an external 15 to 30 VDC source (e.g., solar panel, external battery, or included 110 VAC to 16 VDC wall transformer).

EXTERNAL BATTERIES: Any 12 volt battery can be connected as a primary power source; the external batteries provide backup while the internal batteries are changed.

PHYSICAL SPECIFICATIONS

SIZE: 8.2" X 5.7" X 3.3" (Input terminal strips extend 0.45" above the panel surface.)

WEIGHT: 6.2 lbs (with alkaline batteries)

WARRANTY

Three years against defects in materials and workmanship.



CAMPBELL SCIENTIFIC, INC.

815 W. 1800 N. • Logan, Utah 84321-1784 • (435) 753-2342 • FAX (435) 750-9540
Offices also located in: Australia • Canada • England • France • South Africa

Copyright © 1986, 1997
Campbell Scientific, Inc.
Printed Sept 1997