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HIGHLAND TECHNOLOGY

V470 analog output / thermocouple simulator module

Features



- 16 independent, galvanically isolated analog output channels. Each channel is independently programmable for mode and output range.
- Voltage mode: provides 16-bit resolution with programmable output voltage ranges from ±25 millivolts to ±12.5 volts.
- Thermocouple simulation mode: simulates most common thermocouples: types J K E T R S B and N. NIST-standard lookup tables are included to allow direct entry of simulated temperatures.
- Four non-isolated precision RTD signal conditioners for reference junction temperature sensing, plus one on-board reference junction sensor. Any thermocouple simulation channel can be associated with any reference.
- Provision for open thermocouple simulation.
- No realtime handshaking is required; all settings may be written to module registers at VMEbus speed.
- Separate calibration connector allows in-crate calibration check.
- Field-wiring termination and module I/O cabling is included in the design architecture. Standard termination panels, thermocouple termination boxes, and cables are available.
- Support for one or two optional 8-channel J470 isothermal junction boxes, each with integral RTD reference junction sensor, or one or two J475 field-wiring interface boards.
- A version is available with an internal full-function BIST subsystem.
- True floating outputs: up to three channels may be connected in series for higher output voltages.
- Clearly labeled DIP switches set VME address: no jumpers, headers, or trimpots.

The V470 is a 6U VME module that provides sixteen independent, isolated analog outputs that may be user-programmed to operate as voltage outputs or thermocouple simulators. Users may write temperature or voltage values at VMEbus speed, and the microprocessor will transparently do all necessary calculations and update the channel electronics.

In thermocouple simulation mode, the V470 includes lookup tables for all common thermocouple types, allowing users to write the desired temperature directly to VME registers. Any channel can be associated with any of the reference junction sensors located in the external field-wiring termination panels, or can use the onboard sensor. Cold-junction compensation is via table lookup of thermocouple potential for the type currently selected. Reference junction temperatures are readable.

Two front-panel D-25 connectors interface to external analog devices. Each connector provides eight differential outputs and connections for two 4-wire RTDs. A D9 connector provides in-crate calibration check. Each isolated channel incorporates a software controlled DPDT relay that allows the channel output to be diverted to the test connector.

Up to four output channels may be series-connected to provide outputs up to ±50 volts.

An optional built-in-self-test (BIST) subsystem adds additional switching and an onboard ADC and firmware that allows the invocation of a full closed-loop test of all ranges of all 16 channels.

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Specifications : V470 analog output/thermocouple simulator module

FUNCTION	16-channel VME analog voltage output and thermocouple simulation module
DEVICE TYPE	16-bit VME register-based slave: A24:A16:D16; Implements 256 16-bit registers at switch selectable addresses in the VME 16 or 24 bit addressing spaces
CHANNELS	16, programmable functions, galvanically isolated
RANGES	Programmable per channel; 10 bipolar voltage ranges: ±25 mV, 50 mV, 80 mV, 125 mV, 250 mV, 500 mV, 1.25 V, 2.5 V, 5 V, 12.5 V; Thermocouples: Types J K E T R S B N
RESOLUTION	Voltage mode, 16 bits: 0.76 µV/LSB on 25 mV range; Temperature simulation mode, 0.0625°C
OUTPUT IMPEDANCE	0.25 Ω max
OUTPUT CURRENT	20 mA min into short circuit indefinitely
OUTPUT LOADING	Stable for capacitive loads up to 2 µF
OUTPUT PROTECTION	Differential, short or applied ±35 V DC or peak AC; Common-mode, ±750 V DC or peak AC; ESD to 15 KV, human body model
RTD INPUTS	Four non-isolated thermocouple reference junction inputs, 100 R or 1 K 4-wire Pt 385 RTD sensor
RTD ACCURACY	±250 PPM, equiv to 0.0625°C, range -65 to +150°C
INPUT PROTECTION	Shorts to ground, ESD
ONBOARD SENSOR	Semiconductor reference junction temperature sensor, ±2°C typical accuracy
OPERATING TEMPERATURE	0 to 60°C; extended MIL/COTS ranges available
CALIBRATION INTERVAL	One year
POWER	Standard VME supplies: +5 V, 0.6 A max +12 V, 1 A max -12 V, 5 mA max
CONNECTORS	2 D25 female for channels and RTDs; D9 male for test
INDICATORS	LEDs indicate VME access, CPU activity, error conditions; Additional user programmable LED
PACKAGING	6U single-wide VME module
CONFORMANCE	ANSI/VITA 1-1994 (R2002) VMEbus spec; does not support byte writes; Thermocouple tables based on NIST/ITS-90 RTD tables per IEC-751 for 385 curve RTDs

Output Accuracy:

Error	TYPICAL	LIMIT 15-35°C	LIMIT 0-60°C	LIMIT -40-80°C
Offset	±5uV ±30ppm of range	±20uV ±175ppm of range	±30uV ±300ppm of range	±40uV ±400ppm of range
Gain	±50ppm of output	±310ppm of output	±660ppm of output	±940ppm of output

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