MODULUS

Advanced Communications Controller
Everest Compatible

The Modulus Everest Advanced Communications controller provides a drop-in replacement and upgrade path for the previous generation Pinnacle Everest controller. A Modulus Advanced Communications module is combined with a smart Discrete I/O panel to provide the same I/O capacity and terminal block wiring of the original Everest Controller. Programs created for Everest controllers can be downloaded to the new Advanced Communications Controller with little if any modification. The upgraded system will see a significant performance boost (typically 10x or more) with increased storage capacity at a lower cost due using the latest technology.

The main differences compared to the original Everest hardware are:

- Extremely fast operation with hardware floating point math
- Micro SD instead of IDE flash disk; more capacity, less cost
- 4 serial ports instead of 5—RS-232, 422, and RS-485
- 1 USB port instead of 4
- Radios and modems are connected externally
- Battery backed power is now external; can be redundant
- Modular I/O Expansion via Modulus I/O bus

8x-7092 4DIO, 8AI, 20DI, 12DO
8x-7094 4DIO, 8UI, 20DI, 12DO
8x-7096 4DIO, 8AI, 4AO, 20DI, 12DO
8x-7098 4DIO, 8UI, 4AO, 20DI, 12DO

Modulus Everest Advanced Communications Controller

- **1 FAST 32-BIT PROCESSOR WITH HARDWARE FLOATING POINT**
- **1 ETHERNET PORT**
- **1 USB (HOST) PORT**
- **4 SERIAL PORTS (2 X RS-232/485/422, 1 X RS-232/485, 1 X RS-485)**
- **4 HIGH-SPEED DISCRETE INPUTS/OUTPUTS**
- **8 PROCESS OR UIVERSAL (SENSOR) ANALOG INPUTS**
- **4 OPTIONAL ANALOG OUTPUTS**
- **20 OPTICALLY ISOLATED DISCRETE INPUTS**
- **12 RELAY DISCRETE OUTPUTS**

STANDALONE OPERATION

The Modulus Advanced Communications controller can serve as a standalone device with SCADA communications, local and web human machine interfaces (HMIs), trending and data logging, alarming, reporting, and programmable control.

COMMUNICATIONS

Advanced Communications controllers have an Ethernet port , a USB port, and four serial ports to communicate with Modbus, DNP3 and Bacnet devices, as well as Allen Bradley PLCs. The controller can also serve as a communications concentrator or master controller.

GRAPHICAL, MOBILE, AND LOCAL HMIs

Configurable graphical web and mobile device interfaces are built in. The front panel display can also be customized to show live process values and states, and make setting changes.

HISTORICAL TRENDING AND EVENT LOGGING

Advanced Communications controllers have an internal solid state flash disk as well as a micro SD memory card slot to record over 100 years of data! You can retrieve and display historical data with built-in web tools and extract trend and event data as spreadsheet files.

REPORTING

Reports can be created in minutes showing live values, production totals, trend and event data, alarm summaries, etc. Customize reports with your own logos and graphics. Call up reports on demand, or have them automatically transferred to your computer.

ALARMING

An Advanced Communications controller can manage alarm conditions on any of it's local inputs, as well as thousands of conditions monitored from other modules and sites. Alarms can be displayed locally, and annunciated by e-mail and text message via an Internet connection, and synthesized voice over a telephone line. The controller maintains a journal of when alarms occurred, when they were acknowledged, by whom, and when the alarm conditions cleared.

PROGRAMMABLE LOGIC

Advanced Communications controllers support programmable logic written in any mix of the five standard IEC-61131 languages including Ladder Logic, Function Block, Structured Text, Sequential Function Chart as well as Flow Charting.

PUMP & PID CONTROL

Advanced Communications controllers have built-in pump control (float or level) and PID control blocks.

GAS FLOW CALCULATIONS

Advanced Communications controllers support the calculations, journaling and traceability required for temperature compensated gas flow monitoring.

REDUNDANCY

Advanced Communications controllers support redundancy for enhanced reliability. If a controller goes off-line, a designated backup can take over automatically.

ICL

www.iclinks.com

Modulus ADVANCED COMMUNICATIONS—EVEREST Controller Specifications

FIELD I/O

Discrete Input/Outputs:	**4**	Non-isolated DC or contact closure (DC to 20KHz maximum), or open collector outputs that switch to ground
Input Range:		Contact closure or open collector driver to ground, or 0 to 30Vdc (ON=<1.5V, OFF > 2.5V)
Input Current:		0.5mA (internal current source)
Filtering		Individually configurable: 5Hz, 10Hz, 20Hz, 50Hz, 100Hz, 500Hz, 1KHz, 2KHz, 5KHz, 10KHz+
Output Rating:		Up to 32Vdc/1A maximum
Output Protection:		Automatic over-current, over-voltage, and over-temperature
Discrete Inputs:	**20**	Optically Isolated, bipolar (AC/DC, not polarity sensitive)
Input Range:		0 to 30V (OFF < 6V, ON>9V) (120/240V available on request)
Input Current:		1.2mA @ 12V, 3mA @ 24V
Filtering		Individually selectable—20Hz, 100Hz
Discrete Outputs:	**12**	Relay contacts, Form A (normally open)
Contact Output Rating:		240/277 Vac, 30Vdc, 3A maximum per output (resistive load). **Do not exceed 8A total of all outputs**
		A snubber diode (DC) or RC snubber (AC) must be used across the relay contacts or load connections for **any** inductive load.
Analog Inputs	**8**	16-bit, Delta Sigma, individually selectable input ranges
Maximum signal level		35Vdc on any range
		[8x-7092, 8x-7096] (Process Analog inputs)
Input Ranges:		• 20mA (minimum input for full accuracy is 0.5mA) • 5V and +/- 5V, 10V and +/- 10V, 30V
		[8x-7094, 8x-7098] (Universal Analog inputs)
Input Ranges:		• 20mA (minimum input for full accuracy is 0.5mA) • 5V and +/- 5V, 10V and +/- 10V, 30V • +/- 75mV • 50K ohms • J, K, T, E, R,S thermocouple (ungrounded type) • 10Ω Cu RTD, 100Ω Pt RTD (2/3 wire), 1KΩ RTD (2 wire), 3-wire RTDs requires use of two analog inputs • 2.2K, 10K (type II, II and 11.K shunt)
Analog Outputs (option)	**4**	12-bit **[8x-7096, 8x-7098]**
Output Ranges:		• 20mA

COMMUNICATIONS

Ethernet:	**1**	10/100mb/s (10/100 Base-T)
SCADA Protocols		Modbus TCP & UDP (master/slave), Ethernet IP (master/slave), DNP3, BACNET, SDX (128-bit encryption, master/slave), Ethernet-Serial bridging
Internet Protocols		HTTP (server), FTP (server & client), ICMP (ping; server and client), NTP (client), DHCP (server & client), DNS, DDNS, Telnet
USB:	**1**	Host port, mini type B
Serial:	**1**	RS-485 (This port is available if not used for bus communications with other controllers.)
	2	RS-232, RS-485, RS-422 (These ports are always available for general purpose communications.)
	1	RS-232, RS-485 (This port is always available for general purpose communications.)
Baud Rates		115K, 38.4K, 19.2K, 9600, 4800, 2400, 1200 baud
Protocols		Modbus RTU (master/slave), DF1 (slave), BACNET, DNP3, SDX (128-bit encryption, master/slave), NMEA 0183 (GPS)

HMIs

Local:	128x32 graphical, wide temperature range yellow OLED and single pushbutton
Graphical:	Web based, graphic library included. Compatible with most browsers, including Internet Explorer, Firefox, Chrome, Safari, Android
Mobile:	Web based, text only. Compatible with most browsers, including Internet Explorer, Firefox, Chrome, Safari, Android

PROGRAMMING

Type	ScadaBuilder, ScadaWorks (with ISaGRAF), and web logic, graphical user interface, historical trending, and alarming configuration
Languages:	Ladder Logic, Function Block, Structured Text, Sequential Function Block, Instruction List, Flow Chart
Capacity:	32MB

STORAGE

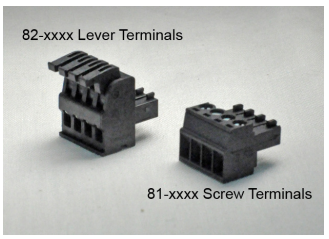
Registers:	65535 registers: Numeric, Boolean, Strings (10K maximum)
Internal Flash disk:	32MB
Removable disk:	Micro SD Card (16GB standard as supplied from factory, upgradable up to 256GB by customer)

CLOCK

Real Time Clock:	Temperature compensated with lithium battery backup power
Stability	+/- 3ppm from –30°C to 70°C

GENERAL

Input Power:	10Vdc to 30Vdc
Power Consumption	135 mA @ 12Vdc / 72 mA @ 24Vdc **plus** 10mA @ 12Vdc / 5mA @ 24Vdc additional current per ON relay (does not include analog output current sourced from input power)
Field Wiring (comm):	**[81-70xx]** screw terminal blocks **[82-70xx]** lever terminal blocks, 3.5mm, 22 to 14GA wires
Temperature:	-40°C to 70°C (operating), -40°C to 85°C (storage)
Humidity:	<95% RH (non-condensing)
Enclosure:	Polyamide, light gray (RAL 7035) [Advanced Comm module], Noryl VO1550
Mounting:	35mm DIN rail with bus connector block



Specifications subject to change without notice. Consult factory to ensure that you are working with current information.

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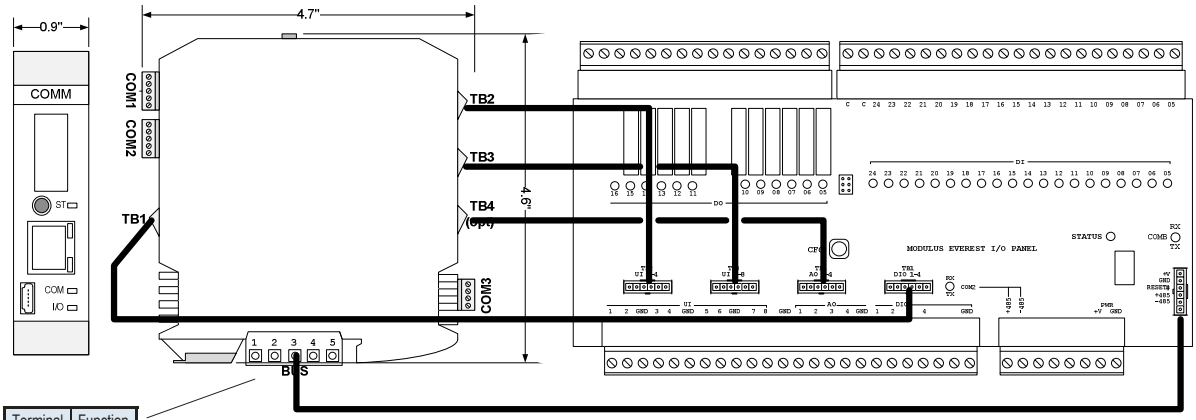
Modulus ADVANCED COMM—EVEREST Controller DIMENSIONS and WIRING

DIMENSIONS and WIRING



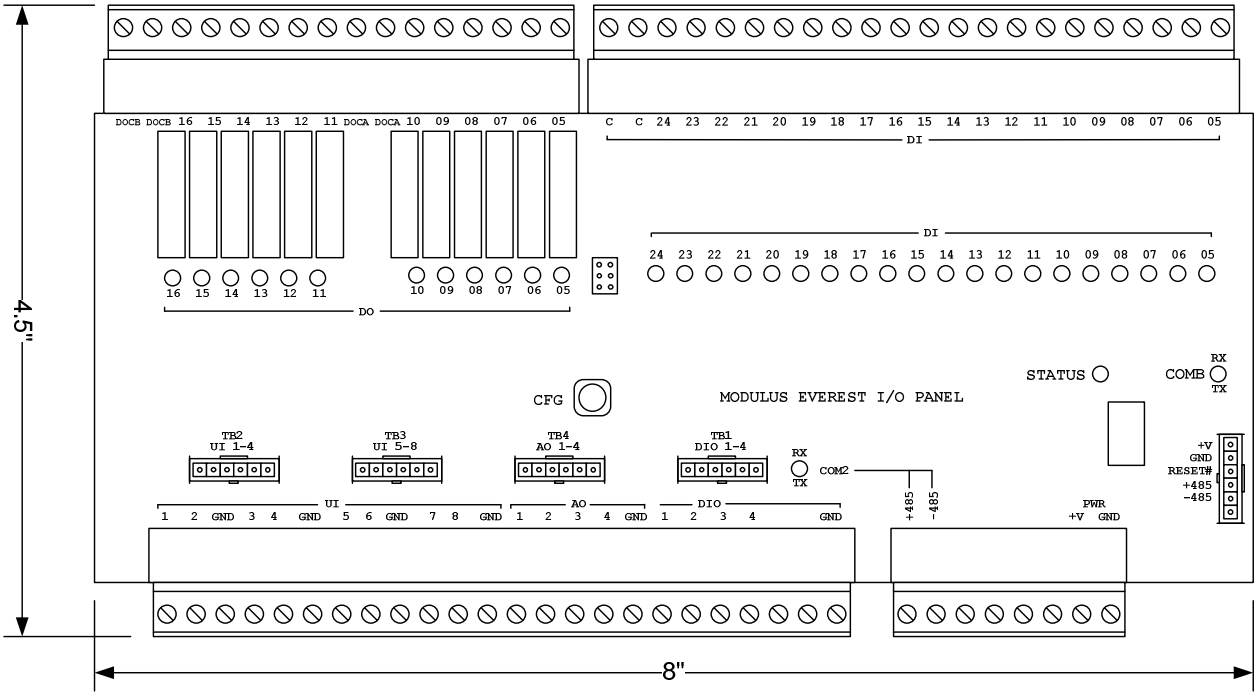
Terminal	Function
1	-485
2	+485
3	RESET#
4	GND
5	+V

Advanced Comm controller to I/O Panel wiring interconnections (cables included)

Adv Comm Controller Terminal

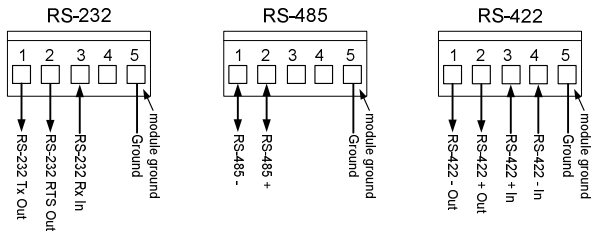
Terminal Block	Inputs/Outputs
TB1	DIO1—DIO4
TB2	AI1—AI4
TB3	AI5—AI8
TB4	Optional AO

Refer to the installation manual for wiring to field devices, as well as additional installation details and precautions.



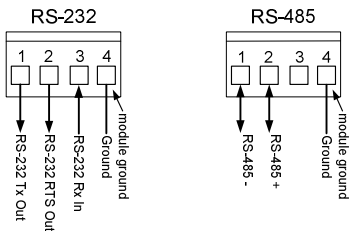
General Purpose Communications Ports COM1 & COM2

(modes are software configured)

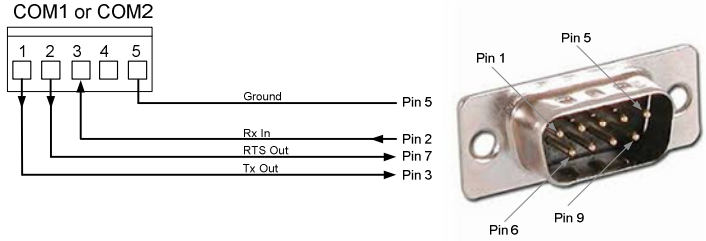


General Purpose Communications Port COM3

(modes are software configured)



Typical RS-232 Wiring to Modem/Radio



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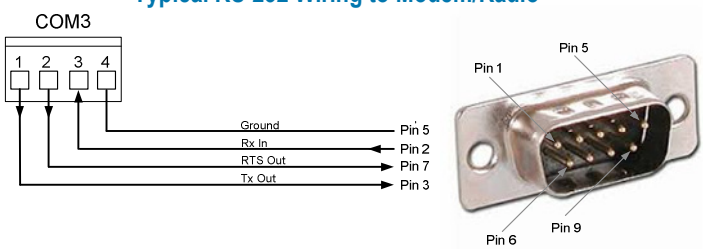

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