

RUGID RUG3 RTU

- **LOW POWER** Draws as little as 2 mA in full operation!
- **Modbus RTU & Modbus TCP/IP** master & slave protocols included
- **FREE** configuration software for easy setup!
- No formal programming experience or knowledge required!
- Built-in library of over 145 pre-compiled modules!
- Supports ladder logic
- Event and data logging
- Compact footprint easily fits inside enclosure
- DIN rail or panel mount available
- Optional operator interface



OPERATIONAL AT 2 MA!

The **RUG3** unit is the latest in a long line of RUGID remote telemetry units designed for remote data acquisition and control applications. It incorporates advanced hardware and software techniques so you can implement your application in minimal time. Numerous hardware and software safeguards are incorporated into the design so you can be assured that the unit will continue to operate for many years in the most demanding field environment.

Standard Features

All RUG3's come standard with the following:

- 6 Analog Inputs
- 8 Digital Inputs
- 4 Digital Outputs (3A relay or 0.5A solid-state)
- USB/RS232 port
- 2nd RS232 port (substitution with RS485 optional)
- 2KB of lithium battery-backed RAM
- 60KB of program flash
- 2MB of logging memory
- Real-time clock/calendar
- 24V fused loop supply
- 5V reference
- Removable screw terminals
- Onboard temperature
- Onboard supply voltage measurement

Hardware Part Numbers:

RUG3B	RUG3 board (no enclosure or LCD)
RUG3BL	RUG3 board with LCD (no enclosure)
RUG3C	RUG3 in DIN rail mount steel enclosure
RUG3D	RUG3 in DIN rail mount steel enclosure with LCD and keyboard
RUG3P	RUG3 in panel mount steel enclosure with LCD and keyboard

OPTIONS:

-485	Substitute P2 RS232 port with RS485
-MR	Mechanical relay option, 4 channels, 3A
-SR	Solid-state relay option, 4 channels, 0.5A
M	Modem option, radio or leased-line compatible, 300 baud
O	Analog output option, 2 channels optically isolated, 12 bit, 4 – 20 mA
R3SDI-12	RUG3 SDI-12 module

Accessory Part Numbers:

R3CBL232	RS232 cable, 3.5 mm to DB9 female
R3CBLAUD	Modem audio cable, RX, TX, Key, 3.5 mm to tinned leads
R3CBLAUDRA	Modem audio cable, RX, TX, Key, 3.5 mm right angle to tinned leads
R3CBLUSB	USB to mini-USB cable
WT	12 VDC, 800 mA wall transformer

Specifications

- **Logic Family:** All low power CMOS
- **Microprocessor:** 16-bit MSP430, 8 MHz, 16-bit data bus, 16-bit address bus
- **Memory:**
 - RAM – 2 Kbytes battery backed low power static RAM
 - Program FLASH – 60 Kbytes
 - Logging FLASH – 2 Mbytes
 - Battery Backup – Lithium coin cell backs up RAM & real-time clock/calendar, min. 2 years
- **Display:** 2 line X 16 char backlit LCD, sunlight readable, backlight switchable by software
- **Keyboard:** 16 key sealed tactile membrane with interrupt scanning
- **Real-time clock/calendar:** Battery backed clock/calendar
- **Operation Security:**
 - Watchdog Timer – Hardware timer resets unit 0.5 seconds after interrupt fail. Cannot be disabled
 - Telemetry Watchdog – Resets rcv buffer if no character received within 1 second
 - Brownout Detector – Halts process if logic voltage falls below 2.7 V, restarts when voltage rises to 3 V
- **Autobooting:** Auto startup on power application
- **I/O Surge Protection:** All I/O is equipped with circuitry to protect from surges
- **Analog Inputs:** 6 channels, 12 bit res., successive approx, 4 – 20 mA or 0 – 5 V, factory calibrated
- **Analog Outputs:** 2 channels optional, 4 – 20 mA, 12 bit res. Optically isolated, factory calibrated
- **Digital Inputs:**
 - Status – 8 channels, dry contact compatible, self-powered
 - Pulse Counting – DI pairs can count >1200 pps
 - Pulse Duration Detecting – All DI can convert pulses to analog with 4ms resolution
 - Shaft Encoder – DI's in pairs used to decode shaft encoders
- **Digital Outputs:**
 - 4 channels, 10-amp mechanical relays (3A @ 277VAC/30VDC; 3A @ 125VAC) OR 0.5 amp solid-state relays
 - Pulse Duration Outputs – Relays can generate PWM or one-shot signals with 4ms resolution
- **Anemometer Input:** AI6 connected to clipping amp, counted to derive wind speed
- **Reference Output:** 5 VDC, 50mA reference standard, shares pin with DI8
- **Instrument Power:** 24V loop supply switchable to unregulated supply voltage and can be switched on/off by software. Diode isolated
- **Serial Ports:** 2 serial ports – One programming/general purpose port, one general purpose port
- **MODBUS Protocol:** Standard TCP/IP master and slave protocol; Standard RTU master and slave protocol (requires external serial to ethernet)
- **Modem:**
 - Bell 103 standard / ALERT standard
 - 4-wire audio, adj. gain, transformer isolated, optically isolated key line. Low tones mode for splinter chan.
 - Transmit Power – 0 – 4 Vp-p, software adjustable in 32 steps
- **Loop Supply:** Built in switchable regulated 24 VDC, 120 mA, fused
- **Power Interface:**
 - 10-38 VDC +/- 20%, diode isolated, 2 mA normal operation (relays, loop supply and backlight off) to 440 mA max.
- **Communications:**
 - SDI-12 – Standard (requires SDI-12 hardware option)
 - Modbus TCP Master – Standard
 - Modbus TCP Slave – Standard
 - Modbus TCP Slave Mode2 – Standard
 - Modbus Master – Standard
 - Modbus Slave – Standard
 - Modbus Slave Mode2 – Standard
 - ASCII – Standard
 - R9 Protocol – Background CRC gen/decode, variable length messages, user defined message lengths. Can combine status, int, float, in any message
 - R6 Protocol – Used to communicate with older RUG6's, RUG7's, and RUG8's
 - Eavesdrop Mode – R9 protocol, any RTU can accept data passing between any other stations
 - Peer to Peer – Full RTU to RTU or RTU to master or master to RTU messaging
 - Store and Forward – Initiating station sets path through up to 3 intermediary stations
 - Address Range – 1 to 65,000 (1 – 254 when using store and forward)
 - Report-by-exception
- **I/O Connections:** All I/O uses removable rising cage screw headers in banks of up to 10 each, 14 ga wire. RS232 and Modem ports use 3.5 mm cylindrical jacks
- **Software:**
 - Storage – Operating system and all user configuration and programming stored in non-volatile flash memory. Flash loader stored in flash protected boot block
 - Security – Parameter voting and memory integrity test on boot up, CRC gen/detect on serial ports. Program loading CRC protected
 - Scanning – Built in software scans all I/O, ports, timers, and realtime clock
- **Programming:** Applications use precompiled modules resident in flash memory where programmer interconnects modules and sets properties using the **FREE** Windows 7/8/10 compatible Rugid support software.
- **Ladder Logic:** Ladder logic built in to configuration program to handle misc. controls
- **Data Logging:** Logs floating point, integer and status sample with time tags to onboard flash EEPROM. Log up to 2MB of samples and time tags. Can dump logs to serial port as comma delimited ASCII
- **Variables:** Supports 16 bit integer, 32 bit floating point, boolean, and strings
- **Error Messages:** Configuration program handles all setup errors. Runtime software is self protecting; no runtime errors
- **Enclosure:** 16 gauge steel, blue powder coat DIN rail mountable with display/keyboard (optional)
 - Case: 4.7 X 3.6 X 1.3 in.
 - Panel mount flange: 6.0 X 4.7 in.
 - Board: 4.5 x 3.5 x 0.85 in.
- **Environmental:** -40 to +85 degrees Celsius (logic), -20 to +70 degrees Celsius (LCD display) 0-85% non-condensing
- **Documentation:** Full 230 page technical manual available at www.rugidcomputer.com
- **Warranty:** 1 year standard limited warranty
- **Repair:** Nominal 24 hour turnaround