I/A Series® Remote Terminal Unit (RTU)
RTU 40 Intelligent SCADA Communicator for Integrated Control System Applications

The RTU 40 can be employed over a variety of local or remote system network architectures matching the following customer needs:

- Usage of many protocols either proprietary (Foxboro SCADA P6008) or standard (DNP 3.0, IEC 870-5-101, Modbus, etc.) as listed in the table on Page 4
- Communications management over multiple paths with automatic adaptive geographical re-routing
- Expansion of existing systems using protocol emulation
- Revamping of SCADA systems with a new Master Station that mixes existing RTUs and new types of RTUs
- Intelligent instrumentation integration
- DCS, PLC, electronic flowmeters, intelligent control subsystems integration
- Communication between RTUs of different suppliers in a crowded protocols environment
- Local and remote process variables acquisition and data management
- Local data archiving, processing, calculation, advanced control functions and graphic display
- Sequence of Events (SOE) up to 4 dedicated buffers
- GPS time synchronization
- Flow calculation (AGA3, AGA5, AGA7, AGA8, NX19)
- Multiloop control, logic control and sequencing
- Standard PID, feedforward, cascade, adaptive gain, ratio, override control, multivariable functions, selectors
- Remote loading of configuration, parameters and application software onto RTU 40 FLASH® memory.

RTU 40 OVERVIEW
The I/A Series RTU 40 is a powerful intelligent device specifically designed for integrated control system Applications where, in addition to the traditional RTU functions, enhanced communication capabilities combined with high performance control strategies are required.

The operating flexibility, the capability to meet specific user's requirements, the reduction of the information transfer volume, the optimization of available communication resources, the communication saving costs make the RTU 40 a compact, inexpensive solution for each problem in a complex multi-service process data-network.
The RTU 40 directly handles standard I/O modules and performs Intelligent process control functions for applications requiring highly accurate measurement of process variables, closed loop control, logic control and sequences, sophisticated algorithms, easy programmable through user-friendly sequences configuration (IEC 61131-3 compliant).

**FEATURES**

The following are features of the RTU 40:

- High reliability and accuracy
- Flexible and modular hardware configuration
- CPU redundancy (optional)
- 2 base (up to 12) serial communication ports with plug-in modules
- Fault detection and auto-diagnostics (local and remote)
- Optional built-in graphic color display for local control and maintenance
- 32-bit CPU, 166 MHz clock
- 32 MB SDRAM (up to 64 MB expansion piggyback)
- 4 MB FLASH memory (up to 144 MB expansion piggyback)
- Math coprocessor
- Low power consumption (typical 20 W)
- Certification for industrial environments (according to CE)
- Photo voltaic solar power package (optional)
- Optional use of industrial components on the electronic boards
- Wall/pole and floor mounted cabinets size (HxWxD):
  - 500 x 400 x 250 mm (19.7 x 15.7 x 9.8 in)
  - 800 x 600 x 320 mm (31.5 x 23.6 x 12.6 in)
  - 2000 x 800 x 800 mm (78.8 x 31.5 x 31.5 in)

**Fields of Application**

Some examples of application fields are:

- Oil and gas pipeline supervision, metering and control
- Well heads monitoring and control
- Off-shore platforms
- Tank farms
- Water distribution and reservoirs control
- Water and wastewater treatment plants
- Pump/compressor stations
- Filter beds monitoring and control
- MV/LV electric distribution
- Multi-utilities control (municipal industry and water, gas, power, heating distributors).
ARCHITECTURE
The I/A Series RTU 40 architecture (Figure 1) is based on the Modular 3U Compact PCI with:

- Enclosures and backplanes
- Power supply unit
- Control and processing unit
- Communication subsystem
- I/O modules.

Redundancy can be achieved at any of the following levels: CPU, power supply, RTU I/O modules. A fault-tolerant backbone bus (RS-485-C) interfaces each RTU I/O module.

Control and Processing Unit
Standard features are:

- Pentium CPU Board, AMD K6-2E at 166 MHz
- 32 MB soldered synchronous DRAM
- 4 MB disk on-chip FLASH
- 512 KB (L2) CACHE (8 ns synchronous, pipeline-burst with extended cache ability)
- Real-time calendar clock with rechargeable lithium cell
- 2 Mbit FLASH-On board
- Front panel (the standard front panel provides: COM1, COM2/fieldbus, keyboard, PS-2 mouse)
- 10/100BaseT/TX Ethernet
- FireWire standard plus USB
- 6 W power consumption

Optional features include:

- Graphic controller S3/4MB
- Fieldbus piggyback (4TE)
- 64/96/128 MB SDRAM expansion piggyback
- Up to 144 MB Disk on-Chip FLASH expansion module
- Extended front panel (the extended front panel [4TE] provides: COM2, LPT1)
- Option extended temperature range
- Standard I/O piggypack (4, 8, 12 TE).

Enclosures and Backplanes
- ICP—HOUSI—30/42/84
  - The Compact PCI unit is based on industrial racks in 30, 42, 84 TE versions, EMI protection.
**Power Supply Unit**
- ICP–AC/DC–60
  - ac/dc power supply unit with 60 W, three outputs, CPCI compatible; option extended temperature range (−40 to +85°C).
  - Input voltage: 115 V (99 to 135 V) or 230 V (187 to 253 V) ac jumper selectable
  - Input Frequency: 48 to 70 Hz
- ICP–DC24–60 or ICP–DC48–60
  - 24/48 dc/dc power converter with 60 W, three outputs, CPCI compatible; option extended temperature range (−40 to +85°C)
  - Input Voltage: 24 V (18 to 36 V) or 48 V (36 to 72 V) dc.

**Communication Subsystem**
The RTU 40 is designed to build up hierarchical data transport networks on diversified transmission media, supporting multiple communication protocols.
The RTU 40 is equipped with asynchronous and synchronous serial communication channels, that can be connected to a wide range of different communication media, in single or redundant configurations:
- VHF/UHF radio networks
- Switched telephone lines, ISDN
- 2/4 wires analog/digital dedicated communication lines, in point-to-point or multidrop,
- Dedicated RS-232-C/RS-485-C digital communication lines
- Satellite communications
- Cellular telephone networks
- Fiber optic links
- Digital dedicated networks on PCM transmitter/receiver service channels, with V.11 interface
- X.25 networks through X.28 PAD access points
- Power line carrier
- LAN (Ethernet) interface.

| Protocols supported by the RTU 40, either standard or proprietary, are listed below: |
|---------------------------------------------|---------------------|
| Master/RTU communication protocols | Foxboro SCADA P6008 |
| | DNP 3.0 |
| | IEC 870-5-101 |
| | Modbus (a) |
| Field protocols | Modbus |
| | Foxboro SCADA P6008 |
| | IEC 870-5-101 |
| | IEC 870-5-103 |
| | PROFIBUS (a) |
| | LON (a) |
| | CAN (a) |
| | Device Net (a) |
| LAN protocols | TCP/IP |
| (a) Under development. |

**RTU 40 Typical Network Applications**
RTU 40 functionalities in a SCADA network architecture is (Figure 2):
- Local front-end, I/O communication server integrated within the Master Station through a LAN
- Local RTU concentrator, connected to the Master Station through one or more local high speed communication lines
- Remote RTU concentrator, connected to the Master Station through one or more communication lines and any available communication media
- Sub-Master Station, combining the above RTU functions with some of the typical Master Station functions.

Different data transmission supporting media include:
- Satellite network
- UHF/VHF radio waves
- Switched telephone lines
- Serial communications
- Cellular telephone networks
- Fiber optic link
- Power line carrier
- LAN.
PHYSICAL SPECIFICATIONS

Physical Size
Eurocard height
ENVIRONMENTAL SPECIFICATIONS

Ambient Temperature
0 to +50°C (optional –25 to +70°C)

Humidity
5 to 95% (noncondensing) at 40°C

CERTIFICATIONS

Certifications
SAFETY
EN60950, EN50178, EN61010, UL1950,
CSA222950
EMISSION COMPLIANCES
EN55022B, FCC Class B
IMMUNITY COMPLIANCE
EN55024

Certifications (Cont.)
SHOCK AND VIBRATIONS
IEC 721-3-3
INTERNATIONAL CERTIFICATIONS
CB-Scheme
RAILWAY SPECIFICATION
EN50155
ISO
ISO9001

OPTIONS

The following are options for the RTU 40:
- Use of Industrial components on the electronic boards
- Redundancy: CPU, I/O cards, serial I/O cards, power supply modules
- Enclosure IP65 certified for outdoor protection
- Solar power package.

I/A Series RTU 40 Key Features

The following are key features for the RTU 40:
- SCADA Communicator has been included into the I/A Series RTU family to solve, at low cost, communication problems between supervisory control centers and remote automation spread in a wide area network.
- It has been designed to interface and merge multi-interconnected and multi-service remote process data-communication networks adopting different standards, protocols and transmission media.
- Top-class RTU with enhanced high local processing power for typical control room applications (pumping/compressor/metering stations, water/wastewater treatment plants, electric substations, and so forth).
60 W POWER SUPPLY UNIT (FIRST SYSTEM SUPPLY)

K6 CPU 166 MHz, W/O FIREWIRE, USB, AND GRAPHICS

BLANK PANEL

INTERFACE MODULE FOR MOUSE, KEYBOARD, COM1 AND COM2/FIELDBUS

INTERFACE MODULE FOR LPT1 AND COM2

POWER ENTRY PANEL

60 W POWER SUPPLY UNIT (SECOND SYSTEM SUPPLY)

7 FREE BACKPLANE SLOTS

INTERFACE MODULE FOR LPT1, COM2

TERMINAL INTERFACE UNIT FOR MOUSE, KEYBOARD, COM1 AND COM2/FIELDBUS

K6 CPU 166 MHz, 8 MB FLASH ON SOCKET

DUAL PIGGYBACK CARRIER BOARD FOR FIELDBUSES, SERIAL LINE MODULES, ETC.
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