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Tetragenics Company Newsletter | *Putting You in Control!* | Volume 2 May 1997

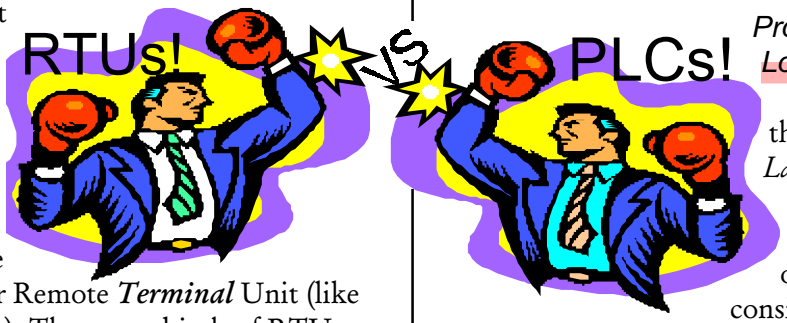
RTUs vs PLCs

What is the Difference?

by Steve Shannon

IN THIS ISSUE

A common question we hear from people just becoming involved in automation is *"What is the difference between a PLC and an RTU?"* Before answering I try to find out if they actually know what the acronyms *PLC* and *RTU* really represent (see the related article about acronyms in general on page 3).



PLC means Programmable Logic Controller. RTU can represent Remote *Telemetry* Unit or Remote ***Terminal*** Unit (like Tetragenics offers). These two kinds of RTUs are compared against PLCs across the industry.

But, knowing what PLC and RTU stand for is not enough. You need to know what each provides. In this article I discuss the differences between a PLC and the two types of RTUs, starting with the least sophisticated and working towards the most sophisticated device.

Remote Telemetry Units

Remote *Telemetry* Units are usually nothing more than a multiplexed addressable I/O device with communications. They have input and output points, and they are connected to a more intelligent controller. The controller is responsible for the control algorithm. This kind of *RTU* has very little computing power and is specified for use in installations like water and wastewater automation.

The Remote *Telemetry* Unit is strictly a slave device. It is not programmable and cannot be used as a stand-alone controller, but it is usually addressable. You can use it to relay status and values both from the remote site to a controller and from the controller down. But it cannot communicate with other devices at or below its own level.

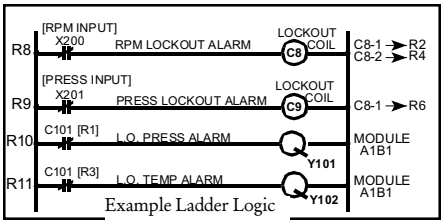
Programmable Logic Controller

PLCs use what the industry calls *Ladder Logic*. [Ladder Logic is a representation of relay logic and consists of two vertical lines with contact symbols along the rungs in between (hence, the ladder look - see the example below).]

The first PLCs were just a software representation of relay logic. In other words, they were designed to duplicate the functionality of a rack of interconnected relays. In the last few years higher end models have been supplemented with analog inputs and outputs. A wide range of pricing is available from low end PLCs at $150, to high end models that sell for around $100,000.

The low end PLCs are not even addressable (they cannot be used as a slave to another device or as a component in a control system).

Continued on page 2...



Example Ladder Logic

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RTUs vs PLC - Face Off

... Page 1 Continued

PLCs scan their I/O by electrically reading each I/O point. This is done quickly, but in a system with lots of I/O points it can take some time to completely scan all the points.

PLCs can be used as stand-alone devices but they are difficult to configure. You must use ladder logic to program them. Normally, they are not usable as the master controller in a control system. If your system contains lots of I/O that must be monitored or controlled, PLCs are usually not the best choice. They are not appropriate for use as protocol convertors or for controlling other intelligent electronics devices (IEDs).

A navigator on the USS Naval Ship George told his captain they were on a collision course.

The captain radioed the blip on the screen. "You are on a collision course, please alter your course."

"Roger" came the return voice. "Suggest YOU alter course."

"Surprised, the captain said again, " I repeat, you are on a collision course, alter your route."

"Roger that, we suggest you alter course."

Loosing his patience the captain boomed into the radio, **"This is Captain Johnson of the USS George, I order you to alter your course!"** After a moment a calm voice came over the radio.

"This is a lighthouse. It's your call!"

Remote Terminal Units

The most sophisticated of the three devices is the second kind of RTU — the Remote *Terminal* Unit. This is the kind of RTU that Tetragenics helped pioneer.

These RTUs actually have the intelligence needed to control a process (or multiple processes) without intervention from a more intelligent controller or master. Tetragenics RTUs offer SCADA capabilities and features that lesser RTUs cannot begin to offer, such as interrupt driven digital inputs, time stamped sequence of events, datalogging, intelligent communications, multitasking sequential control, PID control, alarm logging, modular construction, easy programming; well, the list just goes on and on.

The Remote *Terminal* Unit is a fast and flexible solution to most control needs. It serves both as the master controller or a slave controller. In fact, it can be used as both a slave and master simultaneously in a vertically deployed control system. Also, it is easy to use as a protocol converter or for controlling IEDs. And it can be expanded as the control system grows.

Face Off

The face off between PLCs and RTUs really depends on what you need and can afford now and what you need in the future. Sometimes a quick look at where you want your system to be 2, 5, or even 10 years from now can help you decide what you want to buy today.

If you have a small system and need only a slave device with little computing power, a Remote *Telemetry* Unit will probably work. But if you need to interface with other devices, you will have to look to PLCs or Remote *Terminal* Units.

If you need a stand-alone device that has power, a PLC might work for you. But be prepared for some programming training, PLCs can be difficult to configure. And because of the wide price range, you get the functions you pay for.

If you need an intelligent unit to control multiple processes without intervention from a controller or master, you need a Tetragenics Remote *Terminal* Unit. These intelligent units also provide advanced control functions and are suited for expansion.

Know Before You Buy

Whatever unit you select, make sure it meets your requirements. And remember, just because you think RTU stands for Remote *Terminal* Unit, someone else thinks it stands for *Really Tuff Umbrella*. TG

TETRA VIEWS

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Acronym Soup - It's a Mouthful

Have you noticed that every product nowadays has to have its own little acronym (a word made up of the initial characters of a grouping of words). One of the first shortcuts people look for is in their speech or writing. Consequently, our lives are riddled with acronyms. Perhaps as a measure of the intensely busy lives they face, acronyms are especially prevalent among engineers. But keeping track of industry and company acronyms and exactly what they mean (and what function the product can perform) can be confusing and sometimes downright misleading. We have no acronym police to tell us we are wrong. Like it or not, acronyms are here to stay. So, we decided to ask around and find out what TLAs people use the most. Good grammar notwithstanding, here's some of what we found. If you have a different definition for any of these (and I am sure some of you do), let us know. We will have a *face off*.

Acronyms

A/D - Analog to Digital
AC - Alternating Current
ADC - Analog to Digital Converter
AFRC - Air-Fuel Ratio Controller
AGA - American Gas Association
AI, ANI - Analog Input
ANSI - American Nation Standards Institute
AO, ANO - Analog Output
ASAP - As Soon As Possible
ASCII - American Standard Code for Information Interchange
BCD - Binary Coded Decimal
Bios - Basic input/output system
bps - bits per second
Byte - Eight bits
CAD - Computer Aided Design
CD-R - Recordable CD-ROMs
CD-RW - Rewriteable CD-ROMs
CDPD - Cellular Digital Packet Data
cent - century
CI - Counter Input
CMOS - Complex Metal Oxide Semiconductor
CMS - Communications Monitoring System
CPU - Central Processing Unit
CRT - Cathode Ray Tube
D/A - Digital to Analog
DAC - Digital to Analog Converter
DC - Direct Current
DI - Digital Input
DIMM - Dual inline memory module
DO - Digital Output
DOS - Disk Operating System
ECL - Emiter Coupled Logic
EEO - equal employment opportunity
EFM - Electronic Flow Measurement
EIA - Electronic Industries Associations
EIT - Engineer in Training
EPROM - Erasable Programmable Read Only Memory
FAQ - Frequently Asked Questions
FAT - Factory Acceptance Test
FET - Field Effect Transistor
Fubar - Fowled up beyond all recognition
FYI - For Your Information
FYA - For Your Amusement
GUI - Graphical User Interface
HMI - Human Machine Interface
IDE - Independent drive electronics
IED - Intelligent electronic device
IEEE - The Institute of Electrical and Electronics Engineers
I/O - Input/Output (connections from a computing device to the outside world)
IRS - Internal Revenue Service
ISA - Instrument Society of America, or Industry Standards Architecture
LAN - Local Area Network
LED- Light Emitting Diode
MMI - Man-Machine Interface
MOSFET - Metal Oxide Semiconductor Field Effect Transistor
MRI - Magnetic Resonance Imagining
MTBF - Mean Time Between Failure
MUX - Multiplexor
NEC - National Electric Code
NEMA - National Electrical Manufacturers Association
NFPA - National Fire Protection Association
OSHA - Occupational Safety and health Administration
PAL - Programmable Array Logic
PCA - Printed Circuit Assembly (a PCB with components)
PCB - Printed Circuit Board
PCS - Plant Control System
PE - Professional Engineer
PEEL - Programmable Electrically Erasable Logic
PID - Proportional-Integral-Differential control
PLC - Programmable Logic Controller
RAM - Random Access Memory
ROM - Read Only Memory
rpm - Revolutions per minute
RTD - Resistance Temperature Detector
RTU - Remote ***Terminal*** Unit, Remote *Telemetry* Unit
SCADA - Supervisory Control And Data Acquisition
SCSI - Small computer systems interface
SIMM - Single In-Line Memory Module
SMTP - Simple Mail Transfer Protocol
SOE - Sequence of Events
TBOS - Telemetry Byte Oriented Serial Protocol
TCP/IP - Transmission control protocol/Internet protocol
TG - Tetragenics
TGR - Tetragenics Graphics terminal
TLA - Three Letter Acronym
TTL - Transistor Transistor Logic
UL - Underwriter Laboratories Inc
VLB - Vesa Local Bus
VRTX - Virtual Real-Time Executive System
WAN - Wide Area Network
Whatzit - A bacon cheeseburger at the Butte M&M
WORM - Write once read many
WTV - Windows TetraVision

As you can see, the list only gets longer. There is also a whole new slew of *language shortcuts* being created in Internet chat rooms: gbh (great big hug), atm (at the moment), bfn (by for now), brb (be right back), or ttfn (ta ta for now). English professors are even now mourning the loss of the language.

ttfn TG .

OPEN HOUSE A HIT

Thanks to everyone who came to our Open House to celebrate our 25th Anniversary. It was a great success. We stopped counting after 300!

We enjoyed great food, fun demonstrations, and good company.

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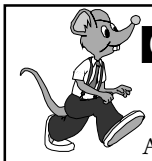
SPOTLIGHT



COME SEE US

We are always available at our offices in Butte, MT. Also, we will be at the shows below. Hope to see you there.

Metro East Trade Centre: May 13-15, 1997, Pickering, Ontario
Water Power 97: August 5-8, 1997, Atlanta Georgia

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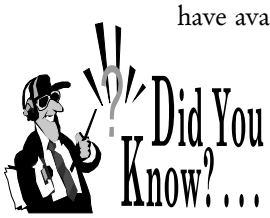


We have a Website. Visit us at www.tetragenics.com. We are adding information all the time. Data sheet information is available and we hope to get the newsletter online soon. Let us know what you would like to have available!

We support a growing line of protocols. If your system needs to talk to existing or new equipment, call us. Also, we offer a wide range of system integration services and engineering support.

We have two new engineers joining our team, **Kirt Mayson and Todd Dvorak.** Kirt and Todd bring years of experience and education to our company. You'll hear more about these guys in later issues.

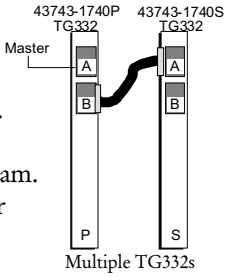
by June Tangaro

More Ports, Multiple Functions

New board option lets you add multiple TG332 CPUs to your system for greater serial expansion. The new option on the TG332 CPU board provides more port capabilities and processing power. You simply add the new board to a chassis containing another CPU board (either a TG332 or Z80). This allows the new CPU to operate independently of the input or output boards in the chassis. The original CPU handles the I/O functions and its own COM ports. Each additional CPU provides another three open, serial ports for connection to other devices (such as expansion units, JEM® meters or Schweitzer relays).

You can increase functionality at a site without disturbing the existing database or adding a new chassis and/or cabinet. Just add the TG332 CPU to the database as a new RTU with its own name, ID, and database. You do not need an added communication link because each additional CPU is connected to the previous TG332's port B. See the example diagram.

The new option number for the TG332 CPU is 43743-1740S. Call for more information. TG



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