RTUs vs PLCs

What is the Difference?

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).
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!"

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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 converters or for controlling other intelligent electronics devices (IEDs).

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
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 - Rewritable CD-ROMs  
CDPPD - 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 - Emitter Coupled Logic  
EEO - equal employment opportunity  
EMF - 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 Imaging  
MTBF - Mean Time Between Failure  
MUX - Multiplexor  
NEC - National Electric Code  
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 - Programmably 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 - Tetragensics  
TGR - Tetragensics Graphics terminal  
TLA - Three Letter Acronym  
TTL - Transistor Transistor Logic  
UL - Underwriter Laboratories Inc  
UL - Underwriter Laboratories Inc  
VBR - 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 tfn (ta ta for now). English professors are even now mourning the loss of the language.  

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OPEN HOUSE A HIT

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**Spotlight**

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.

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**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. Tα

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**Tech Tips**

Ask Our Panel of Experts

by June Tangaro

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**SPOTLIGHT**

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