CHAPTER 2, DO I NEED SCADA OR TELEMETRY?

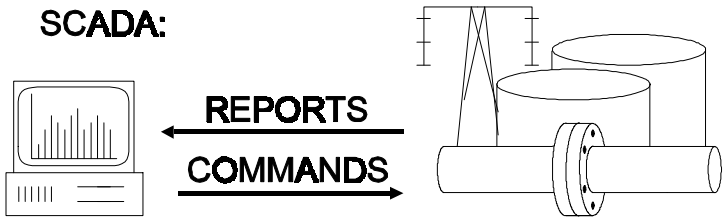
2.A SUMMARY:

The terms **SCADA** and **TELEMETRY** both describe systems which transmit measurements and commands from one site to another using RTUs. The two terms often mean much the same thing. These systems transmit reports and commands to control industrial installations. ANNUNCIATOR systems are also often used to perform much the same functions.

2.B SCADA SYSTEMS:

SCADA stands for **S**upervision, **C**ontrol **A**nd **D**ata **A**cquisition. The term has come to mean systems controlled by a central computer. For example, a PC computer in your office can run supervisory and SCADA software packages such as National Instrument's Lookout or other packages which communicate over an RS-232 port and an MDM-202A modem to a radio or cable system and out to your tank and pump RTUs. These continuously scanning supervisory systems are referred to in the industry as Mode-B systems.

In our tank and pump example, the tank level, the pump condition (running or stopped), the flow rates and pressures, etc., are all now depicted in color graphics on your PC screen. You can start and stop any pump, for instance, by simply moving the cursor over to the 'START' or 'STOP' positions and pressing 'ENTER'. These supervisory systems are very capable and can automatically do a number of complex operations such as writing reports to a printer and/or to a disk drive, performing automatic control and alarm functions, etc.



Supervision, Control And Data Acquisition

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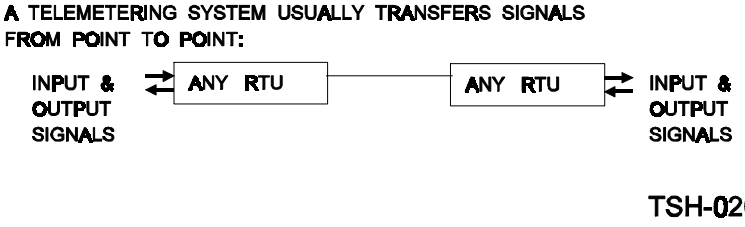
2.C TELEMETRY SYSTEMS:

Telemetry, on the other hand, has come to mean systems where you gather measurement signals at one site and repeat them out in the same form at another site where you connect them to meters and switches. The inputs from the remote site can be connected to an annunciator panel, for instance, where meters and lights indicate what is happening at the remote site. These are referred to in the industry as signal multiplexer or Mode-C systems.

For example, you can input a 4-20 mA level signal at your tank site RTU and get the same 4-20 mA signal out from the RTU in your office. Connecting this signal to a meter will allow you to continuously read the remote level on the meter. You can also flip a switch in your office which outputs a relay closure at the remote pump site RTU, which in turn starts or stops the pump.



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The simplest example of a Mode-C signal multiplexing system is where two RTUs communicate with each other over cable or radio. All analog and digital signals input at one RTU are automatically output at the other RTU. How many signals can a system like this transmit? As many as there are input and output circuits at each RTU. In these systems one RTU is the master and the other is the slave. The master RTU continuously polls the slave RTU which immediately answers each poll. With a test set such as the ScanData TTS you can hear the polling and answering tone 'chirps' at both the master and the slave RTU. Should the cable or radio communication link be broken, you will only hear the outgoing poll at the master, and no RTU answer. At the slave RTU you will hear nothing.

A second example of a Mode-C signal multiplexing system is where one master RTU communicates with two or more slave RTUs. In these systems, any analog or digital signal input at any point can be output at any other point. The master RTU can re-direct any signal from any RTU to any other RTU. Signals can also be simultaneously output at more than one RTU or at the master.

2.D ANNUNCIATOR SYSTEMS:

An annunciator panel is one where the incoming signals from the field instrumentation are displayed on meters (analog signals) or by colored lights or by lighting up glass panels with text on them (digital signals).

These annunciator panels are still installed, all over the world, in spite of the convenience of more modern computer screen presentations.

Immense annunciator panels are often installed in power generating stations, breweries and elsewhere. A multitude of meters, switches, rheostats and indicating lamps and panels allow the operator to control the installation.

Miles of cables connect between the panels and the outlying sensors and actuators.

Nowadays, to lessen cable costs, signal multiplexing telemetry (Mode-C) is often used to carry the analog and digital signals to and from the field. In addition to savings on cable costs, signal multiplexing telemetry carries another advantage: All signals are digitized so that future connections to a computer system is very simple.

2.E A LITTLE COMPUTER HISTORY:

Before the Personal Computer revolution, computers were very expensive and were often run by a special Data Processing (DP) department, housed in special air conditioned quarters. The DP department often had their own way of doing things. Nobody outside the department really understood what they were doing and nobody dared question what they did (or the money they spent).

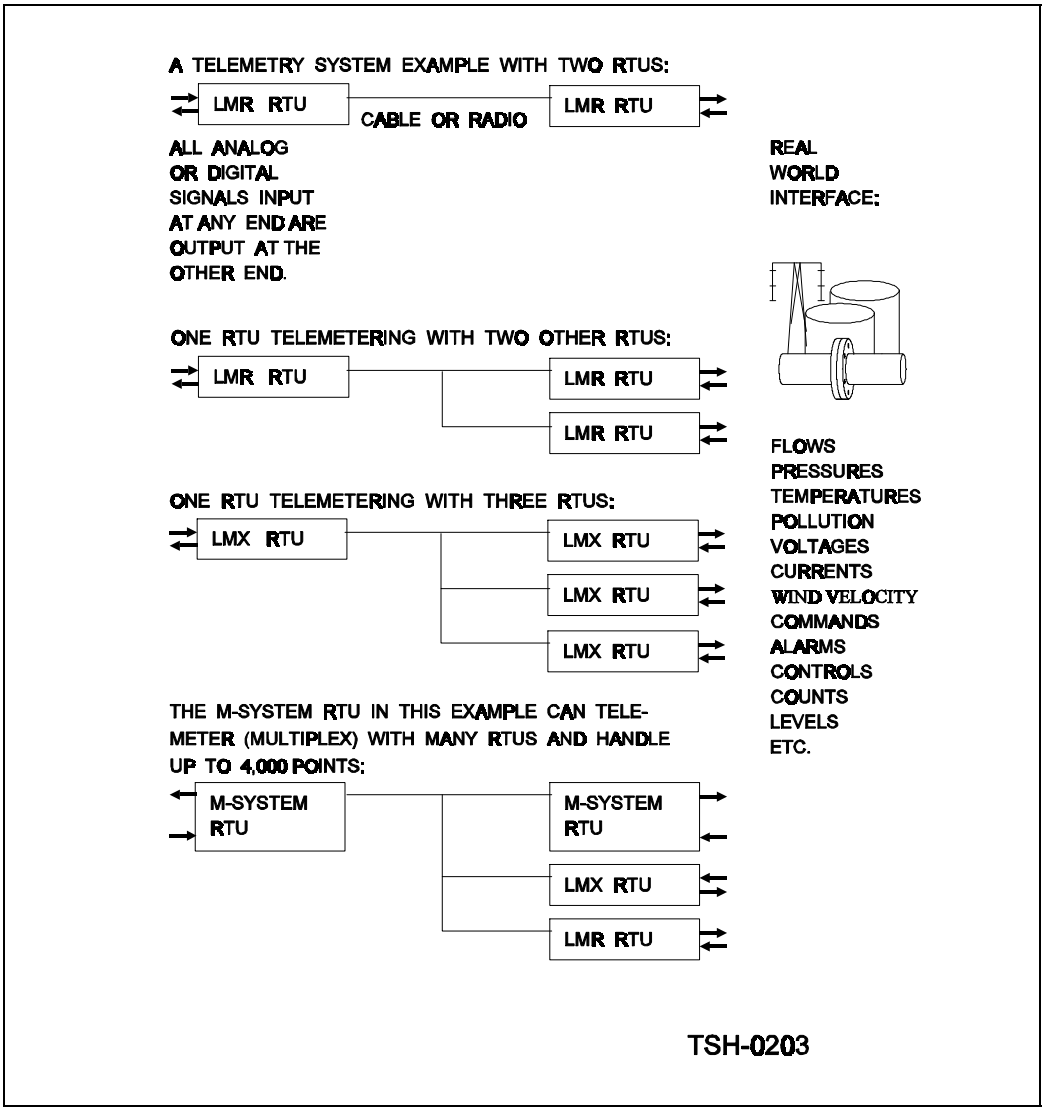
The Personal Computer revolution, as we all know, changed all that as it is continuing to change our lives. Our future will be changed by Personal Computers in ways we cannot yet imagine.

In the beginning there was resistance to the widespread use of computers in many companies, both by the DP department that did not want to loose control and by many operators who where intimidated by the keyboard. Today, you can hardly run an operation, no matter how small, without the use of one or more laptops or PCs. Most devices used in measurement and control now contain computers (or microprocessors) in themselves. Many pressure, temperature, level and flow sensors do. Most all RTUs and PLCs do. You now need laptop computers to program most PLCs.

Lets face it. PCs and laptops are here to stay. They make our work easier. Today, there is no reason to install any system that does not use PCs in some form or one that is at least PC compatible. Mode-B systems use PCs as central station. Mode-C systems should communicate in a manner which can be understood and intercepted by PCs.

2.F WHAT SYSTEM SHOULD I CHOOSE?

This chapter is serving as an introduction to these systems. The following chapters of this Handbook deals in detail with the design, installation and operation of Telemetry and SCADA systems.



2.G YOU NEED COMPATIBILITY.

The one major requirement of any system is this one: Each component of the system should be able to communicate with any other component.

For example: You can buy a light bulb in Chicago, a lamp in New York and when you screw the bulb into the lamp and plug it in into an electric power socket in Los Angles you can be certain that it will work.

There are horror stories. A small town in Lapland in northern Sweden had 250 volts DC wired into all the houses. Well, there are not many manufacturers of 250 volt DC light bulbs left in the world, and the citizens of this town have to pay dearly for their light bulbs. And their radios. And their refrigerators (if they ever need them up there).

Even worse. A manufacturer of RTUs had his own, secret protocol that his RTUs used. This locked his customers in to using his central stations and software. Good for the manufacturer but not so good for the customer. Suddenly the manufacturer ceased manufacturing these RTUs and started manufacturing another type of RTU with another, even more secret protocol. The old protocol was no longer supported. Where does that leave the customer who bought the old protocol RTUs? Completely without support. The best he can do is to scrap these old RTUs. One wonders what line that company's salesman takes when he visits that customer.

There are also instances where manufacturers of RTUs with proprietary protocols have ceased manufacturing RTUs or simply gone out of business.

Most reputable manufacturers nowadays manufacture RTUs and PLCs with 'open' protocols. Gould Modbus and CAP (Compressed ASCII Protocol) are emerging as the leaders in easy to use open protocols. 'Open' protocols mean protocols that are not secret and are well documented so that any programmer can write central station programs for the RTUs and PLCs purchased.

WHERE CAN I GET MORE INFORMATION?

The following descriptions, pertinent to this chapter, are included in the DESCRIPT directory on the SCADAtech(TM) CD:

pri-0901.pdf Design Guide and Price List.

gui-0980.pdf How to design SCADA and Telemetry systems.

app-1104.pdf How to send multiple analog and digital signals

An easy way to get the latest and most recently updated versions of these descriptions is to go on our WEB site:

www.scan-data.com

When you are there, click on the blue button near the bottom of the WEB page that says **Technical Information.** Then click on the description # you need.