

Introduction to Scan-Data's new WEB edition of the Telemetry & SCADA Handbook.

The Handbook was first published in 1994. It is in use as textbooks in numerous schools and used as reference books in industries around the world. It is, to our knowledge, the only Telemetry & SCADA Handbook of its kind in the world.

The complete Telemetry and SCADA Handbook is now available for free on the WEB:

www.scadahandbook.com

Advancements in technology since 1994 have added new ways of implementing Telemetry and SCADA systems. Descriptions of these advancements have been included in the Handbook.

Below are summaries of each chapter and comments where the contents have been upgraded.

CHAPTER 1: What is telemetry?

An introduction to SCADA and Telemetry. In addition to communication by dialing, communication by continuous cable, leased line, radio and fiber optics, communications between RTUs (signal multiplexing), you can now communicate RTU information over the WEB.

CHAPTER 2: Do I need SCADA or Telemetry?

SCADA has come to mean systems where a central computer controls various RTUs. Telemetry and multiplexer systems are where the RTUs communicate with each other, transmitting analog and digital values back and forth. Regardless what system you use, you always need protocol compatibility.

CHAPTER 3: What is an RTU (Remote Telemetry Unit)?

RTU used to mean Remote Terminal Unit. Nowadays it really means Remote Telemetry Unit. There are a great selection of RTUs available, to fit every requirement.

The VTM-7, Voice Box Supervisor, has been upgraded with a lot of additional features and is now renamed VBX-7

CHAPTER 4: Do I use RTUs or PLCs?

RTUs communicate very well without the need for programming. PLCs need programming to perform local control functions and generally do not communicate very well.

Why not combine the two and get the best of both worlds? RTUs can easily be combined with screwdriver and Basic programmable PLCs.

CHAPTER 5: Using smart RTUs.

RTUs are getting smarter and smarter. They all work right out of the box and need no programming to communicate. Some can be programmed to perform PLC and other complex functions. The choice is yours.

CHAPTER 6: What are the RTU input and output (I/O) signals?

The standard 4-20 mA analog in and out signals, the metering pulse in and out signals and the digital (contact) in and out signals will probably be around for a long time to come. For more information on the 4-20mA loop inputs and outputs, see Chapter 21.

CHAPTER 7: How do the RTUs communicate?

RTUs can communicate over radio, cables, leased lines, fiber optics and by dialing. They can now also communicate over the WEB and with Cellular Digital Packet Data.

CHAPTER 8: Dialing the RTU over the phone line.

RTU phone and cellphone dialing is another thing that will be around for a long time. RTUs can now also dial each other and automatically transfer 4-20mA analog and digital (contact) information.

CHAPTER 9: Continuously scanning the RTUs.

Central station SCADA software is becoming ever more cost effective and simple to install and operate. Drag and drop Windows SCADA software is now standard. Also check the Spread Spectrum data radios, a new license free way to communicate.

CHAPTER 10: Signal multiplexing between two or more RTUs.

Signal multiplexing is where several 4-20 mA analog and digital (contact) signals are transmitted from one RTU to another RTU. Across a plant or between distant remote sites. Over radio and over cable and now even by dialing.

CHAPTER 11: Networking RTUs.

Networking RTUs means connecting several RTUs together over cable, in a star or in a serial (Christmas tree light) configuration. Radio and dialing networking always means establishing one or more clusters in a star configuration.

CHAPTER 12: Sensors and actuators.

Some things, like contact (digital) signals, flow meter contact pulses and analog (4-20mA loop) signals never change. Except that now there are more and more sensors and actuators to choose among. Some can even talk. Check the HART protocol modem, which allows you to communicate over the 4-20mA loop.

CHAPTER 13: Protocol converters and data concentrators.

Telemetry and SCADA data communication is constantly improved and updated. Where there used to be numerous proprietary (and secret) communication protocols, there are now only a few open and non-secret protocols in use, like CAP and MODBUS. Any RTU or PLC that you buy should have an open protocol.

CHAPTER 14: What modem to use.

There are four basic types of communication in SCADA systems.

1. Continuous communication over radio and cable uses BELL-202 modems.
2. Dialing communication over phone or cellphone uses BELL-212 dialing modems.
3. Fiber optic cable communications uses fiber optic modems.
4. Letting the RTUs communicate over a private net or on the Internet is a fourth solution. The UDS Device Servers allows connecting serial devices such as RTUs, PLCs and SCADA master station computers to IP based Ethernet networks, quickly and easily. Using a method called serial tunneling, the UDS encapsulates serial data into packets and transports these over the NET. Using two UDS units, connected by a network, virtual serial connections can be extended across a facility or around the world.

CHAPTER 15: Gas flow calculating RTUs.

Installing, programming and operating Natural Gas Flow computers was never easier. Special RTU software with LCD screens with built in help tables minimizes operator training.

CHAPTER 16: Special RTU applications.

Modern RTUs have expanded capabilities, are very versatile and are totally compatible with other systems.

CHAPTER 17: Upgrading existing systems.

Problem:

1. The world is full of old SCADA systems.
2. Some of the SCADA manufacturers are now out of business.
3. Some manufacturers no longer support what they once sold.
4. New plug and play hardware and drag and drop software costs 5 - 10% of what was spent on the old system.
5. Your company may have spent millions of dollars on an old system, which is now obsolete.

Solution:

Point out what was spent for a computer ten years ago, and what it can do. Check what an immensely more capable computer costs today. Do the same thing for new hardware. The solution will be obvious. Budget for a new SCADA system. Modern hardware and software lets you gradually upgrade what you have.

CHAPTER 18: Designing and specifying a system.

There are a number of choices to be made when you design a new SCADA or Telemetry system. This chapter is a good guide for making the right choice.

CHAPTER 19: Installing the system.

Has also become a lot easier, although you still have to go out (or send somebody out) to the site to install it.

CHAPTER 20: Testing and calibrating the system.

This is has also been made easier through modern hardware, software and through detailed technical manuals and application notes. CAP and Modbus protocols now easily interface with most other devices. LEDs indicate proper operation.

Testers like the TTS make trouble shooting Bell-202 cable and radio circuits a breeze. Automatic leased line testers like the ALT solves arguments where leased lines are used.

In summary, the work of the Telemetry and SCADA professionals has become easier and less time consuming, thanks to better equipment. And also, hopefully, thanks to better information like what is contained in this Handbook.

CHAPTER 21: The 4-20mA instrument loop.

This is a new chapter, written in 2005. It explains, in 28 pages, how the 4-20mA instrument loop works, how to install and work with it and how to isolate, calibrate, display, simulate, condition and split the 4-20mA loop. Portions of this chapter were reprinted, with our permission, in the Instrument Society of America (ISA) magazine.

CHAPTER 22: Alarm Dialers and Voice Telemetry RTUs.

This is also new chapter, written in 2006. Alarm Dialers and Voice Telemetry RTUs allow remote supervision of any remote industrial remote installation. Installing one of these RTUs eliminates sending a person out to the site to take measurements, to read flow counters and meters and to start and stop pumps, open and close valves, etc. The cost is low, installation is easy and payback time is short.

New WEB pages.

We have added several new WEB pages to make your search for updated technical information easier:

www.4-20maloop.com

www.scan-data.com

www.4-20alarm-dialer.com

www.telemetryandscada.com

www.bell-202modem.com

www.scadaandtelemetry.com

www.4-20mamux.com

www.scadahandbook.com

www.pumps-control.com

www.pdfscan.com