

CHAPTER 5, USING SMART RTUs

5.A SUMMARY:

RTUs that simply input and report on analog, digital and pulse signals and receive and output analog and digital commands have no need to be programmed. RTUs such as the SLR, the LMR and the LMX work right out of the box. So do the telemetry versions of the SMR and M-system RTUs. Simply connect the input and output circuits and the communication line(s). These RTUs start operating automatically when you power them up.

If you want the RTU to do more than to report and accept commands, select smart, programmable RTUs such as the VBX-7, SMR and M-system. What can these smart RTUs do? They can, for example:

- C Calculate engineering values from raw analog inputs.**
- C Calculate AGA gas flow with NX-19 supercompressibility.**
- C Log and report high and low values.**
- C Interface with gas chromatographs.**
- C Automatically inject odorizer and corrosion prevention liquids.**
- C Periodically log comprehensive reports to disk.**
- C Run gas chart recording replacement programs.**
- C Dial different phone numbers when alarm conditions occur.**

To do this the RTU has to be smart, in other words, you have to be able to program it. You have to tell it what phone number(s) to call, what the span and zero is for engineering calculations, what the high and low alarm limits are, what the time and date is, etc.

The VBX-7, SMR and M-system RTUs are examples of user programmable RTUs that can perform these and a host of other functions.

This chapter touches on only the basics of programming these RTUs. For complete details, please refer to the manual of each RTU.

5.B PROGRAMMING THE VBX-7 RTU

All you need to program your VBX-7 Voice Telemetry RTU and Alarm Dialer is a regular telephone with a keypad (not a rotary dial phone).

You can either program the VBX-7 locally, by plugging the phone into the **'LOCAL'** jack, or you can program it remotely by calling the VBX-7 and enter the secret guard code.

5.C PROGRAMMING THE 40 VOICE PHRASES.

The VBX-7 uses these phrases when it composes a report:

Analog inputs and analog units 4 phrases
Analog high and low conditions 4 phrases
Good bye phrases 1 phrase
Numbers 0 to 9 and decimal point	... 11 phrases
Pause 1 phrase
Pulse counter and pulse counter units	2 phrases
Station identifier 1 phrase
Status conditions and alarms 16 phrases
Total phrases 40 phrases

The method used in recording these phrases is very straight forward. Place the VBX-7 switches as described in the manual, then hold down the **'RECORD'** push button and speak in an even tone into the telephone, letting go when you have finished the phrase.

The VBX-7 digital display shows you which phrase you are recording and also shows you how much total time you have remaining. You can easily listen to each phrase you have recorded and re-record it if you don't like the way it sounded.

5.D PROGRAMMING THE OPERATING PARAMETERS IN THE VBX-7 RTU

Use the telephone keypad to program in the operating parameters the VBX-7 needs to operate. There is no need to first enter a guard code if you program these locally. Among the parameters you can program are:

- C **Phone numbers to dial**
- C **Activating any alarm condition with any phone number**
- C **Enter the access code**
- C **Enter the InterCall delay and Message Start Delay**
- C **Enter analog zero and span values**
- C **Enter analog low and high set points**
- C **Open and close the two relays**
- C **Set the VBX-7 to use tone or pulse dialing**
- C **Reset the pulse (flow) counter**
- C **Read back phrases and registers**

To program these parameters into the VBX-7, you first press the ******* key. This tells the VBX-7 that you wish to enter a command. The second key you press is either a **'0'** (meaning that you want a read back of the value) or a **'1'** (meaning that you wish to program in a value). The third key pressed, 1-9, tells the VBX-7 which of the 9 values you wish to read or program. You then follow with the value itself and finish by pressing the **'#'** key.

The procedure is quite simple and fast, no more difficult than dialing a long distance number on your phone. The VBX-7 gives you an instant readback and you can re-program any parameter as often as you wish.

The VBX-7 manual has detailed information on the programming procedure.

5.E PROGRAMMING THE SMR RTU

The SMR RTU is programmed while on line. Simply call the RTU with any computer and modem combination. Use a communication program such as Procom. Check the manual and set the modem to the proper baud rate, parity and stop bits.

Dial up (Mode-A) SMRs will send a report automatically after it picks up the line (answers the ring). Cable and radio operated SMRs will only respond with a report

after a polling string is sent. This polling string should contain a line feed, a station identifier, an exclamation mark (or two exclamation marks if a checksum is not included), a checksum or a '-' and a carriage return.

5.E.1 SETTING THE TIME AND DATE

Use the standard SMR command format (line feed, station identifier, '%' and T1 (for time) or T2 (for date) to set time and date into the SMR.

5.E.2 TURNING THE OUTPUT RELAYS ON OR OFF

Use the standard SMR command format as described above and R1 for relay one, R2 for relay two, R3 for relay three and R4 for relay four. A following 0 will turn the corresponding relay 'OFF' and a 1 will turn the relay 'ON'.

5.E.3 REQUESTING HISTORICAL DATA

The SMR stores hourly data for 35 days. To get the stored hourly information from any one of these 35 days, send a historical data request to the SMR. Use line feed, the station identifier, '*' and the number of the day of your choice, 1-35.

5.E.4 PROGRAMMING VALUES INTO THE PROGRAMMABLE OPERATING MEMORY

The SMR has a rather extensive Programmable Operating Memory with a built in Data Base Manager. The values in the Programmable Operating Memory are used by the SMR for its operations and calculations. These values are loaded in from EPROM when the SMR first starts operating. After that, they can be examined and changed at any time over special commands.

- C Among the Programmable Operating Memory values are:**
- C Span and Zero values for six analog engineering conversions.**
- C Three telephone numbers to be dialed.**
- C Active or non-active telephone number flags.**
- C Six analog limit activator flags.**
- C Twelve analog alarm limit values (one high and one low limit for each analog alarm).**

- C **Four status input alarm activators.**
- C **Four status normal condition flags (normally open or normally closed).**
- C **Daily report time (24 hour format).**
- C **Six default analog values. The SMR will default to these values should the corresponding transducer fail.**
- C **Six analog default select flags which allow you to force the SMR to use the default value.**
- C **Six transducer failure alarm flag activators.**
- C **Time to dial value (24 hour format).**

Each of these values have a three letter code (check the manual for the code). You transmit a value change order to the SMR by sending line feed, station identifier and one or two ')' (depending on if you wish to send a checksum or not), followed by the three letter code and the value you wish to insert.

The SMR will come back with 'COMMAND ACCEPTED'.

5.E.5 REQUESTING INFORMATION FROM THE PROGRAMMABLE OPERATING MEMORY

To request a reading on any value in the Programmable Operating Memory, simply send line feed, the station identifier, a '=' (or two, if you send no checksum), followed by '/' and the three letter code for the value you wish to read. The SMR will come back with the actual value.

5.F PROGRAMMING THE M-SYSTEM RTU

The M-system RTU is programmed in a similar manner to the SMR. The difference is that the M-system normally contains far more analog and digital inputs, making the Programmable Data Base considerably larger.

The method is the same and the identifiers are organized in the same way, however, so that, once you have learned to program one type of RTU you can easily program the other.

WHERE CAN I GET MORE INFORMATION?

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

pri-0901.pdf	Design Guide and Price List.
gui-0980.pdf	How to design SCADA and Telemetry systems.
vbxc0929.pdf	Voice Box Supervisor RTU fact sheet.
smr-1142.pdf	SMR programming panel.
mrp-1521.pdf	Rabbit 3200 M-system co-processor module
mrs-1532.pdf	StampII M-system co-processor module.
lmp-1342.pdf	LMX RTU with a StampII co-processor.
app-1466.pdf	PLC programming methods.
2BY41559.pdf	2BY4 programming description.

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.