

***Sensaphone*[®] SCADA 3000** **APPLICATION SUPPORT BULLETIN**

Spread Spectrum Radio



SUBJECT

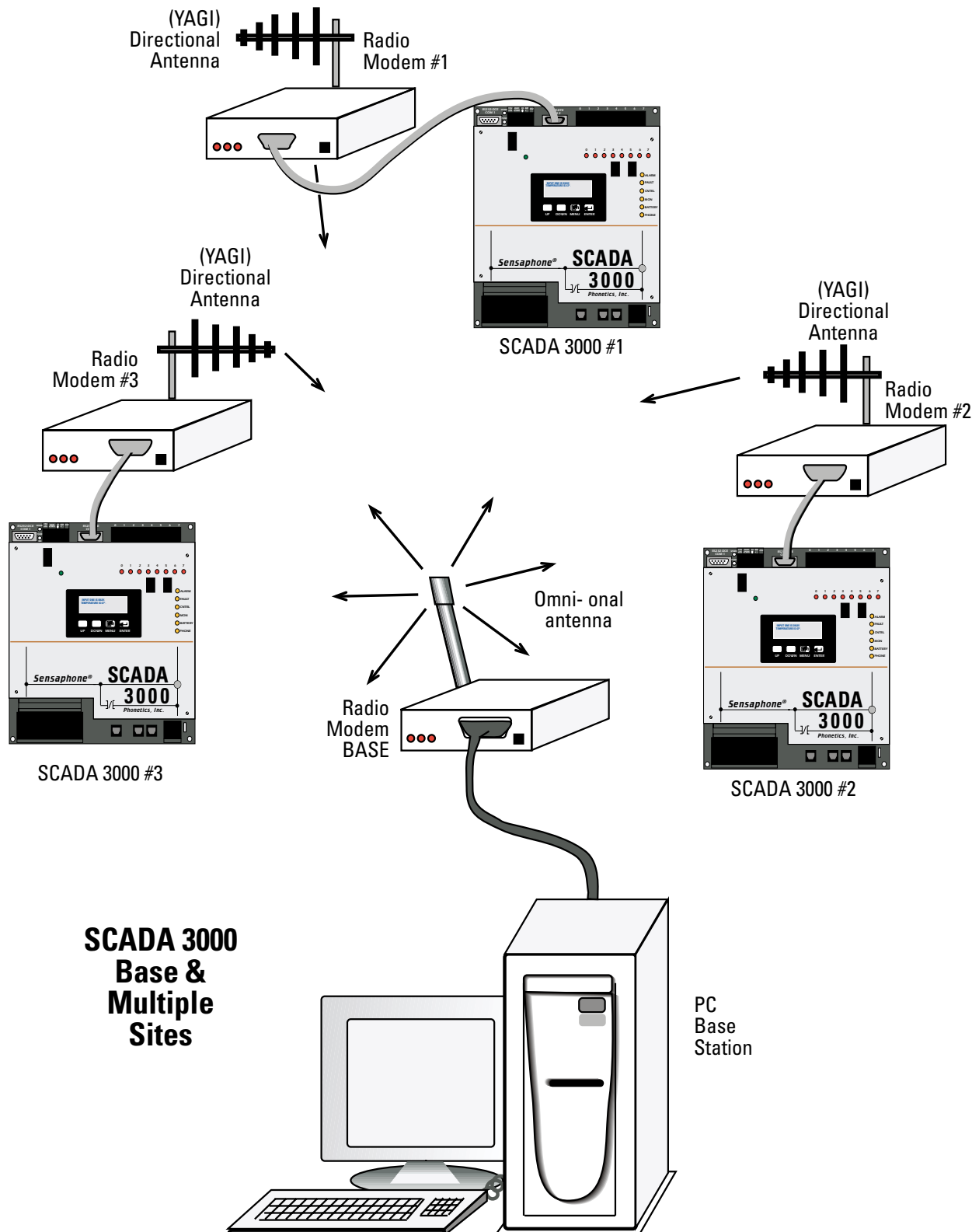
Equipment requirements for a typical Sensaphone SCADA 3000 application using Spread-Spectrum radio modems.

The purpose of this bulletin is to give the designer or user a general idea of the equipment required for a typical application. It is not intended to be an engineering specification.

Sensaphone® SCADA 3000 APPLICATION SUPPORT BULLETIN

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Equipment required for typical SCADA 3000 remote site using a Spread Spectrum radio modem

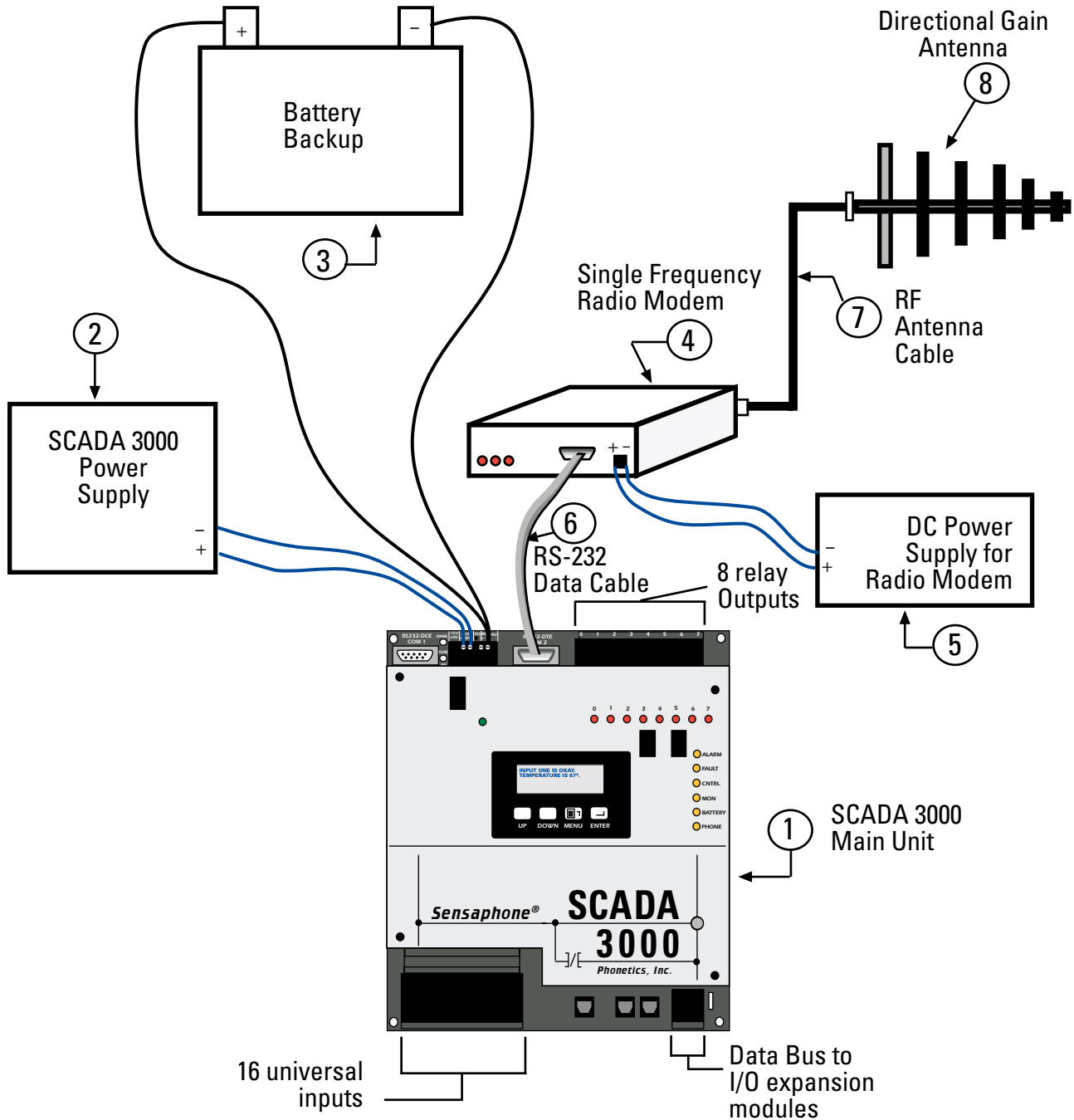


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Equipment required for typical SCADA 3000 remote site using a Spread Spectrum radio modem

SCADA 3000 Remote Site with Licensed Radio Modem

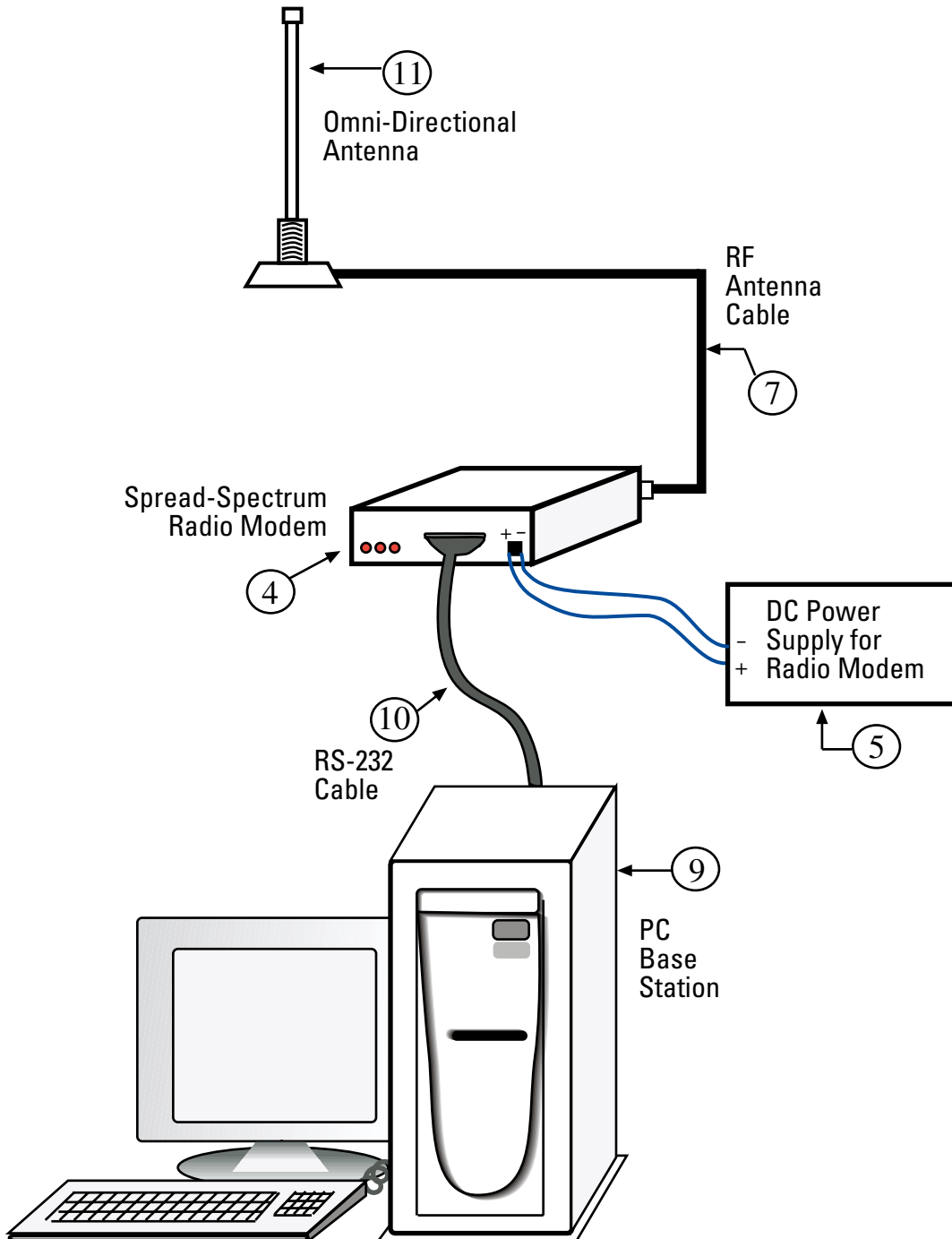


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SCADA 3000 Base Site using a Spread Spectrum Radio Modem



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① SCADA 3000 RTU.

Includes 16 universal inputs and 8 relay outputs. If more I/O is needed, you may add up to 15 SCADA 3000 expansion modules.

Phonetics Part # FGD-3000

② SCADA 3000 DC power supply.

This device supplies 15V DC to power the SCADA 3000 RTU and any I/O expansion modules. Phonetics offers two power supplies as accessories.

Phonetics Part # FGD-3100: Hard-wired power supply for 110V or 220V operation.

The 110V or 220V source voltage must be hard-wired to the screw terminals on this power supply.

Phonetics Part # FGD-3110: Plug-in power supply for 110V operation. Plugs into a standard 110V outlet receptacle.

Notes on powering the SCADA 3000:

SCADA 3000 is designed to be powered from a 10-15V DC power supply (15V required to charge an external battery). This wide operating voltage permits the unit to be powered from 12V solar cells in truly remote applications. However, most applications will have 120VAC available and we recommend using one of the 15VDC power supplies listed above.

③ Backup Battery (optional).

In the event of a power failure, SCADA 3000 can continue to operate if connected to a sealed lead-acid gel-cell rechargeable battery. Phonetics offers two battery kits as accessories.

Phonetics Part # FGD-3200: Standard 5AH Battery & Mounting Kit.

Dimensions: 3.54" x 2.76" x 4.02"

Provides 12-20 hours of backup time for the SCADA 3000 main RTU and up to 2 I/O expansion modules.

Phonetics Part # FGD-3210: Extended 17AH Battery & Mounting Kit.

Dimensions: 7.13" x 3.00" x 6.58"

Provides over 24 hours of backup time for the SCADA 3000 main RTU and up to 4 I/O expansion modules.

④ Spread Spectrum (frequency hopping) Radio Modem.

In many cases, the same radio modem hardware can be configured to operate as a base or a remote station. Some radio manufacturers do offer units specifically designed to function as base stations. These units are packaged differently (usually 19 inch rack-mount), may offer additional diagnostic features, and usually are more costly.

Manufacturer and Model Information for three popular Spread Spectrum Radio Modems are shown below:

Manufacturer:

Data-Linc Group
2635 151st Place NE
Redmond, WA 98052
425-882-2206
www.data-linc.com

Model:

SRM6000
Spread Spectrum Industrial Radio Modem
up to 115.2K Baud
no FCC License Required
Approximate List price \$1800.00

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Manufacturer:
Microwave Data Systems
175 Science Parkway
Rochester, NY 14620
716-242-9600
www.microwavedata.com

Model:
MDS 9810
902 - 928 MHz Spread Spectrum Radio Transceiver
up to 19,200 Baud
no FCC License Required
Approximate List price \$1600.00

Manufacturer:
Wi-LAN, Inc.
300, 801 Manning Road N.E.
Calgary, Alberta, CANADA T2E 8J5
800-258-6876
www.wi-lan.com

Model:
Hopper DS 915A
902 - 928 MHz Asynchronous Spread Spectrum Radio Modem
up to 38,400 Baud
no FCC License Required
Approximate List price \$1100.00

These are only a few examples of many different brands and types of radio modems that will work with the SCADA 3000 RTU.

⑤ DC Power supply for radio modem.

Most radio modems run on 12-16VDC. You must select a power source for the radio that will be able to supply enough current during peak operation.

Note that there are already several sources of DC power available at the SCADA 3000.

a.) +15V IN terminals on the SCADA 3000. This is the same DC source that powers the SCADA 3000 main unit. If you power the radio modem from this source, you must add the current draw of the SCADA 3000 and any I/O expansion modules to the current draw of the radio modem and take care not to overload the power supply. Also note that this source is NOT battery backed. That means if there's a power failure, the radio link to the site goes down.

b.) AUX PWR terminals on the SCADA 3000. This DC source is generated by the SCADA 3000 main unit and is meant to power SCADA 3000 I/O expansion modules. This is a good place to get power for the radio modem if you don't have more than 2 or 3 I/O expansion modules. Check the current draw of the radio modem and take care not to overload the power supply. Also, this source IS battery backed. That means if there's a power failure, the radio link to the site WON'T go down.

If you're using the SCADA 3000 with a lot of I/O expansion modules, the current power supply may not be able to provide enough additional power for a radio modem. In this case, an additional DC power supply is required.

⑥ RS-232 data cable. (\$5-\$30)

This is the cable between the data port on the radio modem and the COM2 port on the SCADA 3000 RTU. One end of this cable must have a DB-9 FEMALE connector to mate with the DB-9 MALE plug in the COM 2 port of the SCADA 3000 RTU.

⑦ Coax Antenna cable: (approx. \$25-\$150).*

⑧ Directional Gain (YAGI) Antenna (approx. \$50-\$500).*

Antennas focus and absorb radio energy in specific directions, depending on how they are designed. A directional antenna transmits radio energy in a single direction. This is perfect for a SCADA 3000 remote site using a radio modem because remote SCADA 3000s only need to communicate with their host or base site.

Phonetics, Inc. Technical Service Department, 901 Tryens Road, Aston, PA 19014 610-558-2700 ext. #260
support@sensaphone.com

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⑨ Personal Computer and Modem.

Minimum requirements:

- Intel Pentium processor or equivalent
- 5 MB of free disk space
- 32 MB of RAM (64 MB RAM recommended)
- Graphics card compatible with Microsoft Windows 95, 98, or NT (such as VGA)
- Microsoft Windows 95, 98, or NT
- VGA or Super VGA monitor
- Mouse
- Voice enabled modem

⑩ RS-232 data cable. (\$5-\$30)

This is the cable between one of the serial COM ports on the host PC and the RS-232 data port on the base site radio modem.

⑪ Omni-Directional Antenna (approx. \$50-\$500).*

An omni-directional antenna transmits radio energy in all directions. This type of antenna works best for a base site because the base radio must communicate with all of the remote site radios.

* There are many details to consider when selecting antennas and antenna cables for radio sites and they are beyond the scope of this application bulletin. Each radio site is different and must be considered individually.

Function Notes:

Alarms:

When communicating with a SCADA 3000 using radio modems, keep in mind that there is no telephone line connected to the SCADA 3000 RTU. Therefore, the RTU can not make alarm telephone calls directly from the remote site. All alarm information is transmitted over the radio network to the host PC at the base site. The host PC then dials out via modem to deliver alarm messages.

Data Logging:

The purpose of Data Logging is to view information collected from one or more remote sites. The way the SCADA 3000 system collects this remote data and transmits it to the host site for viewing depends on the type of communication being used.

When communicating via telephone, the SCADA 3000 RTU stores data samples in its own built-in memory. SCADA 3000 can store up to 50,000 data samples. In order to view this data, the host PC must call the remote SCADA 3000 using a modem, download all the logged data at once, then hang up. Depending on the amount of data, this process could take several minutes. Using telephone communications, the host PC can only be on-line with one remote SCADA 3000 unit at a time. Therefore, the host PC's database file for a particular unit is only as updated as the most recent phone call to that unit.

Advantages to Telephone Data Logging:

- backup copy of most recent data is stored in RTU's memory

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Disadvantages to Telephone Data Logging:

- Data Logger must be downloaded before RTU's memory fills up and begins overwriting data
- only one RTU's Data Log can be retrieved at a time
- while downloading Data Log information from an RTU, no other communications (alarms, reports, etc.) can take place until the download is complete

With radio modem communications, the SCADA 3000 RTU does not store any data in its own memory, but transmits each data sample via radio to the host PC. This means the PC's database file gets updated every time a data log sample is taken by a remote unit. What makes this function so powerful is that these "real-time" Data Log updates aren't limited to just one SCADA 3000 unit. With a radio network, the host PC is always on-line with every remote unit. Because of this, the host PC is capable of providing simultaneous "real-time" Data Logging for every SCADA 3000 on the radio network.