September 2005

# Using a Trimble® SNB900 to reduce the need for GPS base stations.

## Remote Base Station and Virtual Reference Station Rebroadcast

### Learning Objectives

- Learn to configure the SNB900 for use with Remote Base Station (RBS) or Trimble Virtual Reference Station (VRS)

- Understand the different communication options and the features and benefits of each configuration.

- Name the equipment used for different configurations

- Name the 3 Configurations of the base stations that can be used.

- Understand the base authentication methods

- Understand the status information displayed by the SNB900
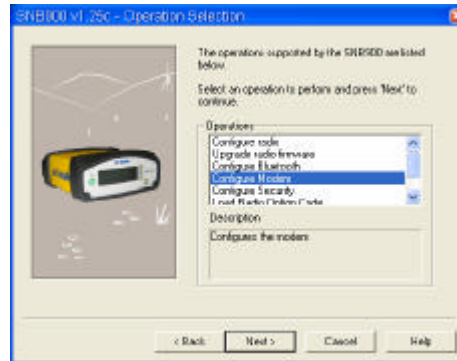
- Basic Troubleshooting

- VRS and 2 Way data

## Configuration of the SNB900 using WinFlash

1) On the computer, run the WinFlash utility. The Device Configuration dialog appears,

    1.  Select SNB900

    2.  Select the appropriate computer serial port (COM port).

    3.  Select SNB900 and then click Next. The Operation Selection dialog appears:



    4.  Select the Configure Modem option and then click Next. The Settings Review dialog appears.

*Note: The SNB900 must be configured, via the front panel, to be in Easy IP mode before select Configure Modem. Rebroadcast is only available when the base station operates in Easy IP mode. Easy IP base broadcast is compatible with V1.44 or higher.*

**The SNB900 should be configured as a BASE station**

2) The Configure Modem Operation dialog will appear.

3) Select the Dial Out radio button.

4) In the Modem Init Strings box, enter the appropriate initialization strings for circuit switched operation with your modem.

   1. The initialization strings used for circuit switched operation with SCS900 should be used here.

   2. For dial out operation init strings are most often not needed.

      i) Nextel cell phones often need an Init String of ATZ0

If you are unsure what strings should be entered, contact the modem provider.

**Configure Modem Operation**

Set
Cancel

**Modem Operation**
○ Disabled    ○ Answer Incoming Calls    ● Dial Out

**Modem Details**
Modem Init String(s):

Note: Ensure your modem has Auto-Answer turned on to answer incoming calls.

**Dial Out Details**
Phone Number(s):
T 68.166.186.39/81

**VRS Position**
☑ Send Position
Lat. (dd mm ss.ssss N/S):    39 52 51.0000 N
Long. (ddd mm ss.ssss E/W):    105 04 42.0000 W
Height:    100.000
Units
○ Meters    ● Feet

**NTRIP**
☑ Use NTRIP
Server User Name:    vrs
Server Password:    ****
Correction Stream:    VRS_CMR

*Note: The Trimble SNB900 does not directly support internet based connections, an Airlink Raven or Redwing modem is used for cellular connections. A Lantronix UDS-10 is used for Wired connections*

5) In the Phone Numbers box, enter the phone number that the modem should dial.

1. The SNB900 can dial up to 4 numbers in a round robin operation. Which is makes operation with a computer with multiple modems easy.
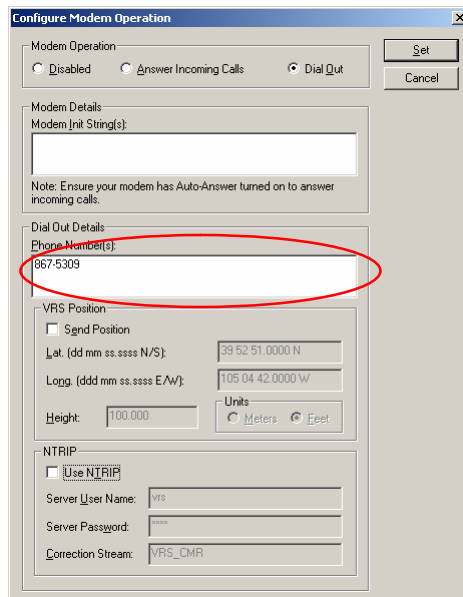
If using an internet modem (Airlink or Lantronix UDS-10) then the phone number should start with a T, enter the port number after a /. Eg T 68.166.186.39/81.

i) Note that the Airlink and UDS-10 need to be configured to operate in the modem emulation mode.

ii) Not all modems will autodetect the baud rate correctly. When using these modems, make sure that the baud rates match.

*Note: The SNB900 only supports rebroadcast of CMR+ messages*

The base station can be any system that supports modem connections

- Modem directly connected to the Base GPS Receiver

- Modem connected to the modem port on a SNB900. The SNB900 is connected to the base GPS receiver.

- The GPS receiver is connected to the Trimble GPSBase software. GPSbase allows for support of more than a single rover.

**Configure Modem Operation**

Modem Operation
- ○ Disabled
- ○ Answer Incoming Calls
- ● Dial Out

Set
Cancel

Modem Details
Modem Init String(s):

Note: Ensure your modem has Auto-Answer turned on to answer incoming calls.

Dial Out Details
Phone Number(s):
867-5309

VRS Position
- ☐ Send Position
- Lat. (dd mm ss.ssss N/S): 39 52 51.0000 N
- Long. (ddd mm ss.ssss E/W): 105 04 42.0000 W
- Height: 100.000
- Units: ○ Meters ● Feet

NTRIP
- ☐ Use NTRIP
- Server User Name: VRS
- Server Password: ****
- Correction Stream: VRS_CMR

6) To use a Trimble VRS, Check the Send Position box in the VRS Position section.

   1. Check the Send Position.

   2. Enter the WGS-84 Latitude, Longitude and Height for the desired position of the VRS.

      The position does not have to be the position of the radio, you should choose a position that is in the center of the operational area

   3. The height entered does need to be within 10m of the correct value.

7) Getting the Lat, Long, Height

   1. Using a MS-750, the front panel displays the Lat, Long, Height.

   2. With SCS900, the easiest way to get a Lat, Long, Height. Is to start the receiver as a base station. The Lat/Long/Height will be displayed at the end of the process.

8) Select the Meters or Feet radio button to indicate what units the height is given in.

**Configure Modem Operation**

Modem Operation
- ○ Disabled   ○ Answer Incoming Calls   ● Dial Out

[Set]  [Cancel]

Modem Details
Modem Init String(s):

Note: Ensure your modem has Auto-Answer turned on to answer incoming calls.

Dial Out Details
Phone Number(s):
867-5309

VRS Position
☑ Send Position

Lat. (dd mm ss.ssss N/S):   39 52 51.0000 N
Long. (ddd mm ss.ssss E/W):   105 04 42.0000 W

Height:   100.000
Units: ○ Meters   ● Feet

NTRIP
☐ Use NTRIP

Server User Name:   VRS
Server Password:   ****
Correction Stream:   VRS_CMR

*Note:   If you connect to a VRS and do not configure the SNB900 to send the position then the VRS will drop the connection after approximately 60 seconds. The behavior of incorrectly sending a position outside the VRS coverage area depends on the VRS server configuration.*

*Note:   Sending positions to a Non VRS system will not cause problems.*

NTRIP is a method for providing user names and passwords for internet based connections, for circuit switched connection caller ID is used. NTRIP is often used for VRS connections, but can also be used for Single base line operations

The Trimble SNB900 does not directly support internet based connections, an Airlink Raven or Redwing modem is used for cellular connections. A Lantronix UDS-10 is used for Wired connections

9) If the Server requires NTRIP, select the Use NTRIP box. The SNB900 can be used to connect to remote bases using NTRIP

10) Enter the Username, password, and correction stream for the NTRIP server.

11) Click Set. The configuration is updated. A status dialog shows when the configuration is complete.

**Configure Modem Operation**

Modem Operation
- ○ Disabled    ○ Answer Incoming Calls    ● Dial Out

[Set]
[Cancel]

Modem Details
Modem Init String(s):

Note: Ensure your modem has Auto-Answer turned on to answer incoming calls.

Dial Out Details
Phone Number(s):
867-5309

VRS Position
- ☑ Send Position
- Lat. (dd mm ss.ssss N/S): 39 52 51.0000 N
- Long. (ddd mm ss.ssss E/W): 105 04 42.0000 W
- Height: 100.000
- Units: ○ Meters  ● Feet

NTRIP
- ☑ Use NTRIP
- Server User Name: vrs
- Server Password: ****
- Correction Stream: VRS_CMR

The SNB900 will now automatically attempt to dial out when a modem is connected.

### SNB900 Modem Connection information displayed

The Modem status information on the SNB900 is accessed by pressing the up or down arrows.

From the main status screen, press the down arrow twice to see the status information. Modem status information follows the CMR reception stats

Note that if pressing the down arrow twice displays the firmware version number, then the Trimble SNB900 is not configured in Easy IP mode. Change the mode of operation by using the Next button.

The SNB900 will display the following information when connecting to a RBS or VRS.

*Note: The phone number to be dialed alternates with the modem status*

1) Idle: The modem is not currently in use. This is normal between connection attempts. If the SNB900 does not change to one of the other states within 60 seconds this indicates a cabling problem. The SNB900 will not attempt to dial unless a modem is connected to the unit. (A full 9 pin modem connection is required)

2) Initializing: The SNB900 is sending the initialization commands to the modem, if Initialization is successful the SNB900 will dial next. If the SNB900 does not move to dialing check the configuration and baud rates of the modem.

3) Dialing: The SNB900 is sending the phone number to the modem

4) Dialed: Modem has dialed and the SNB900 is waiting for the remote to answer.

5) Connected: The remote has answered.

6) Disconnect: The modem has disconnected for some reason, the SNB900 will automatically attempt to redial.

### Connection Methods

There are 5 major options for connections

1) Cellular Circuit Switched Connections

2) Internet Based Cellular Connections

3) Land Line Circuit Switched connection

4) Lease Line connections

5) Internet Based wired connections

These methods all have different advantages and disadvantages.

**Cellular Circuit Switched Connections**

- Generally the easiest system to get working with the least amount of field infrastructure.

- Often highest cost, although some cellular providers allow unlimited cell to cell calling

- Medium level of Latency and variability in latency.

**Internet Based Cellular Connections**

- Not directly supported by the Trimble SNB900 at the moment, requires an Airlink Raven or Redwing modem.

- Generally low cost

- High variance in latency.

**Land Line Circuit Switched connection**

- Generally the easiest system to get working when there is an analogue phone on site.

- Costing depends on local calling area and plan.

- Low level of Latency and variability in latency.

**Lease Line connections**

- Requires special installation by the telecom company.

- Costing depends on local provider and distance between locations. Can often be very cost effective

- Low level of Latency and variability in latency.

**Internet Based wired connections**

- Not directly supported by the Trimble SNB900 at the moment, requires a Lantronix UDS-10

- Generally low cost, the connection can also be used for other services.

- A medium variance in latency depends on connection.


## VRS and 2 Way Data

At this time there is not a cabling solution that support modem connection and 2 way data. Both of these solutions use the 26 Pin port.

Generally on sites that 2 Way data is being used, a local base station solution would be a better solution. A VRS rebroadcast solution does have a PPM error from the VRS position in use.