

ENGINEERING BULLETIN

Bulletin Number: 09-002

Date: 1 April 2009

This Bulletin also applies to:
Engineering Bulletin 07-005 Iridium Modem

Engineering Change:
Annual Maintenance for A3LA Modems Serving as Dial-up Modems

System: Xpert, XDark and 9210 Data Collection Platforms

Originator: Eddie Roggenstein eddie.roggenstein@noaa.gov

Approved by MSCB on: [Not Required](#)

Background:

There are several CO-OPS measurement sites that are unable to have telephone or wireless IP service for data retrieval or maintenance service calls. The use of Iridium modems is not intended for 6-minute PORTS[®]-type sampling due to the cost of each call. The modems should only be used for rebooting or changing the setups of the Data Collection Platforms. Any questions on the use of these modems should be directed to the Chief, Engineering Division in Silver Spring, MD.

This bulletin covers the yearly servicing of the installed modem. Personnel installing a new modem or unfamiliar with these modems should read and follow the information contained in Engineering Bulletin 07-005.

Yearly Service Planning

The Field Team Party Lead shall submit an Equipment Request Form three months prior to the planned service trip to notify the Electronics Lab (CIL/SIL) of the upcoming visit and provide the lab with adequate time to build and test an upgraded system if needed or provide parts and supplies for the yearly service. The Electronics Lab shall notify the Chief, Engineering Division of the request within five days to ensure the availability of updated hardware or firmware.

The Electronics lab shall test and demonstrate any new system no less than 30 days prior to a planned service trip. This advanced time is needed as most Iridium equipped stations are in remote locations and additional time is needed for shipping and customs procedures. The testing shall include connecting the modem to an Xpert, following the procedures in this Bulletin and documenting the test using the checklist on page 8 of this Bulletin. The completed checklist shall be included with the modem and a copy retained for the Labs records.

It is strongly recommended that the installing technician and the laptop that will be used in the field be involved with the unit testing. It is recognized that this is not always possible, but every effort to do so should be made. It is a good policy to check the field computers in the shop before any field trip. Connecting to an Xpert and testing Procomm or other terminal emulator software and computer connections prior to any trip help ensure a successful trip. Procomm screens are used as examples in this Bulletin. Although Xterm is not used in the testing of Iridium modems, testing of Xterm is highly recommended.

Yearly Service

After completing any needed upgrades or component changes the following steps should be performed by the field personnel servicing the station. An Annual Inspection Checklist can be found on page 8 of this bulletin and shall be included in the station documentation package submitted to OET.



Fig. 1. A3LA Iridium Modem

Yearly Service Overview

1. Batteries shall be replaced every three years as per CO-OPS requirements.
2. Check that all connections are secure.
3. Check that all cables are in good shape.
4. Check that the antenna is in good shape and has a clear view of the sky.
5. Perform system checks.
6. Desiccant shall be replaced annually.

RS232 Terminal Block

Check that all wires are secure in their socket. (Fig. 2 & Table 1)

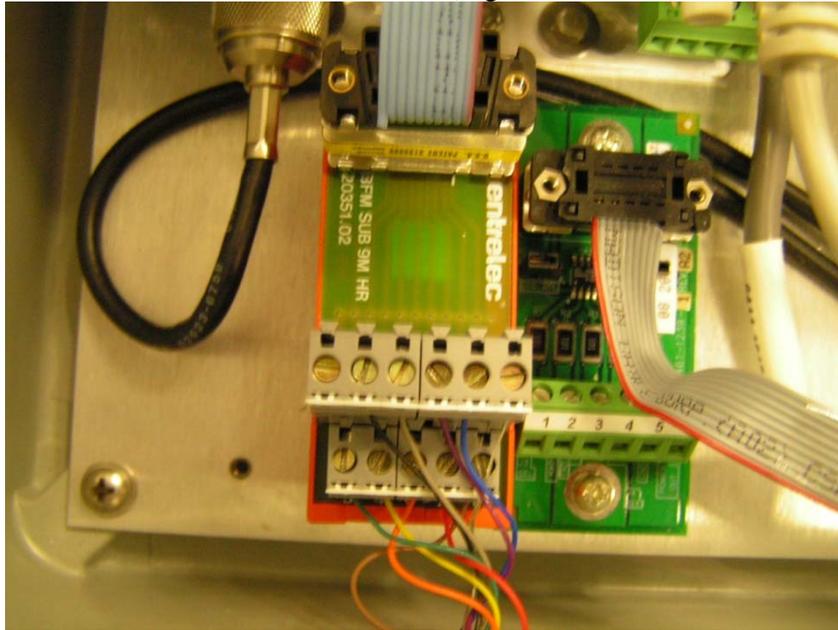


Fig. 2. RS232 Terminal Block

Table 1. RS232 Cable Connections

DB9 Position	PC board Position	Wire Color
1	1	Brown
2	2	Red
3	3	Orange
4	4	Yellow
5	5	Green
6	6	Blue
7	7	Purple
8	8	Gray
9	9	Black

System Checks

Disconnect the modem's RS232 cable from the DCP. Connect the modem to your computer, start Procomm, and set the system to use Direct Connect COM 1 (bottom left of screen) using a baud rate of 19200, 8 bits, no parity and 1 stop bit as shown in Figure 3. For computers with no serial port, select the correct port in Procomm for the USB port that has the serial adapter. Testing this in the shop with the field computer will help ensure a successful trip.

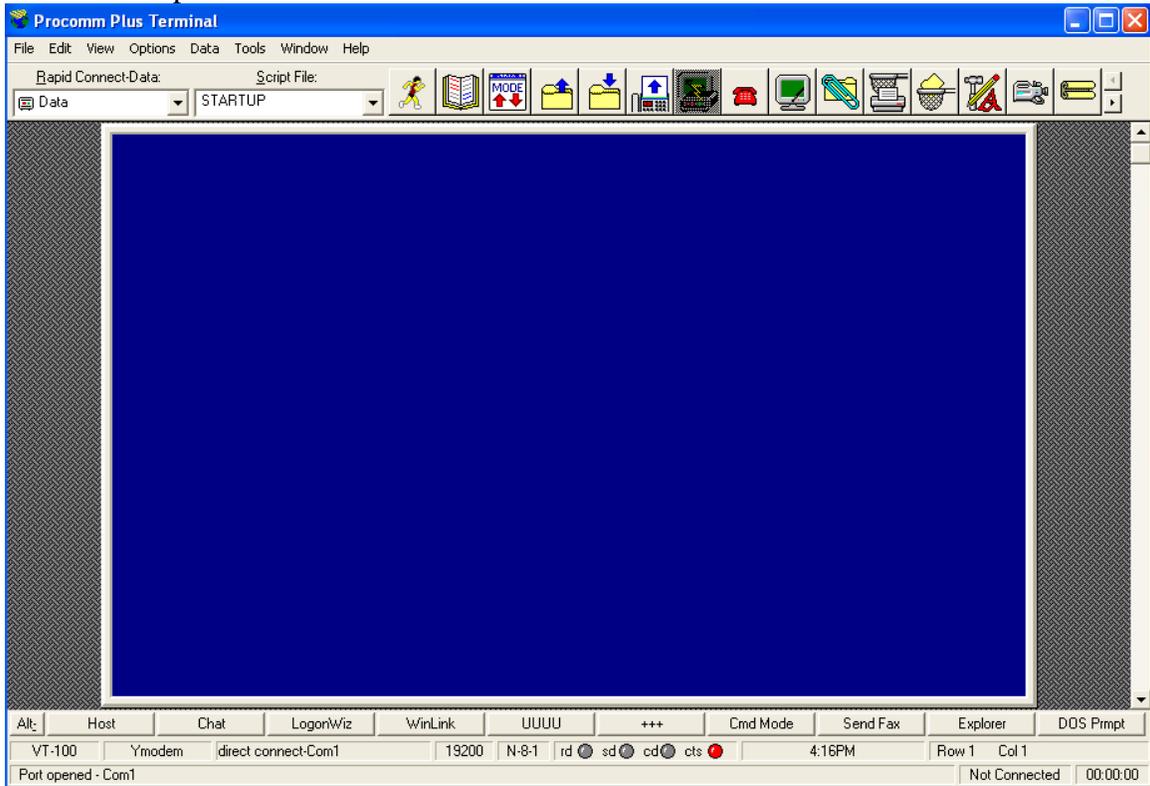


Fig. 3. Procomm Terminal Screen

Checking communication with the modem.

Type: AT (CR)

(CR) = Enter, (upper case is not required)

The modem will respond with *OK* as shown in Fig. 4. If you do not get the *OK*, check all connections and Procomm settings. Sending the AT command wakes up the modem and tells it a command is being sent. The modem always responds to AT with an *OK* (see Fig. 4).

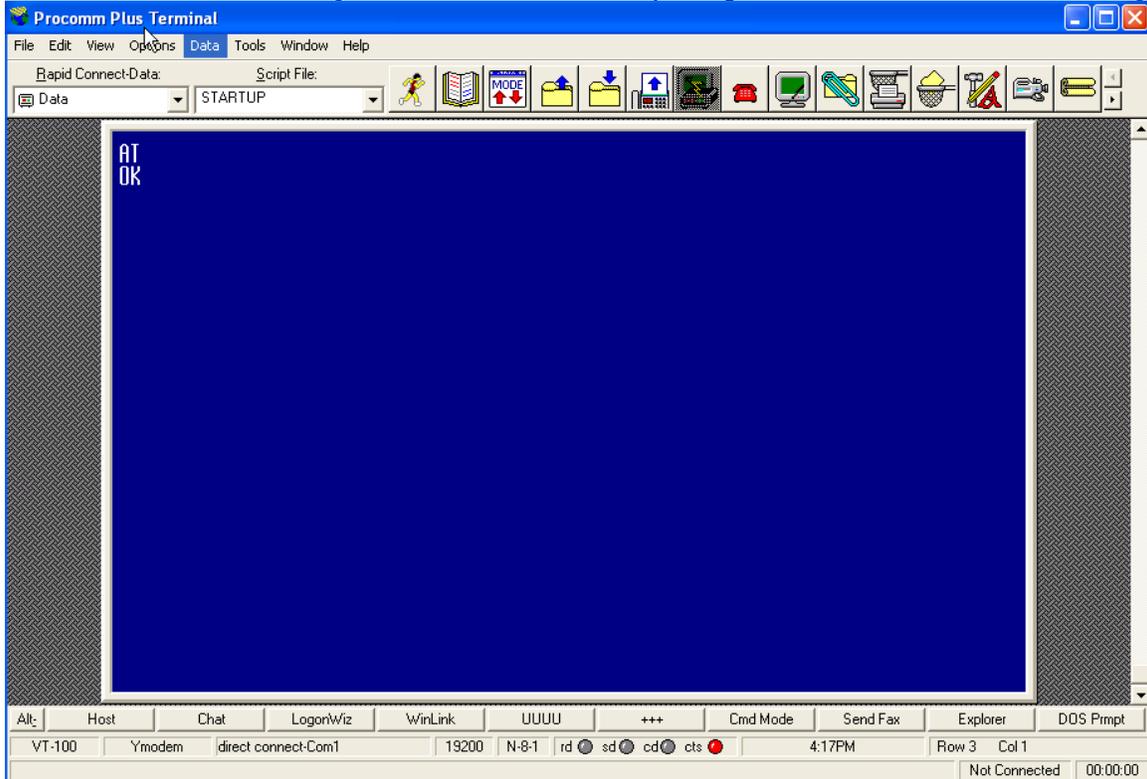


Fig. 4. Procomm Screen after typing AT

Checking signal strength

The modem has a built-in signal strength meter that outputs a number between 0 and 5. To check the received signal:

Type: `AT+CSQ` (CR)

The modem will respond with:

`+CSQ:5` (or some number between 0 and 5) (Fig. 5)

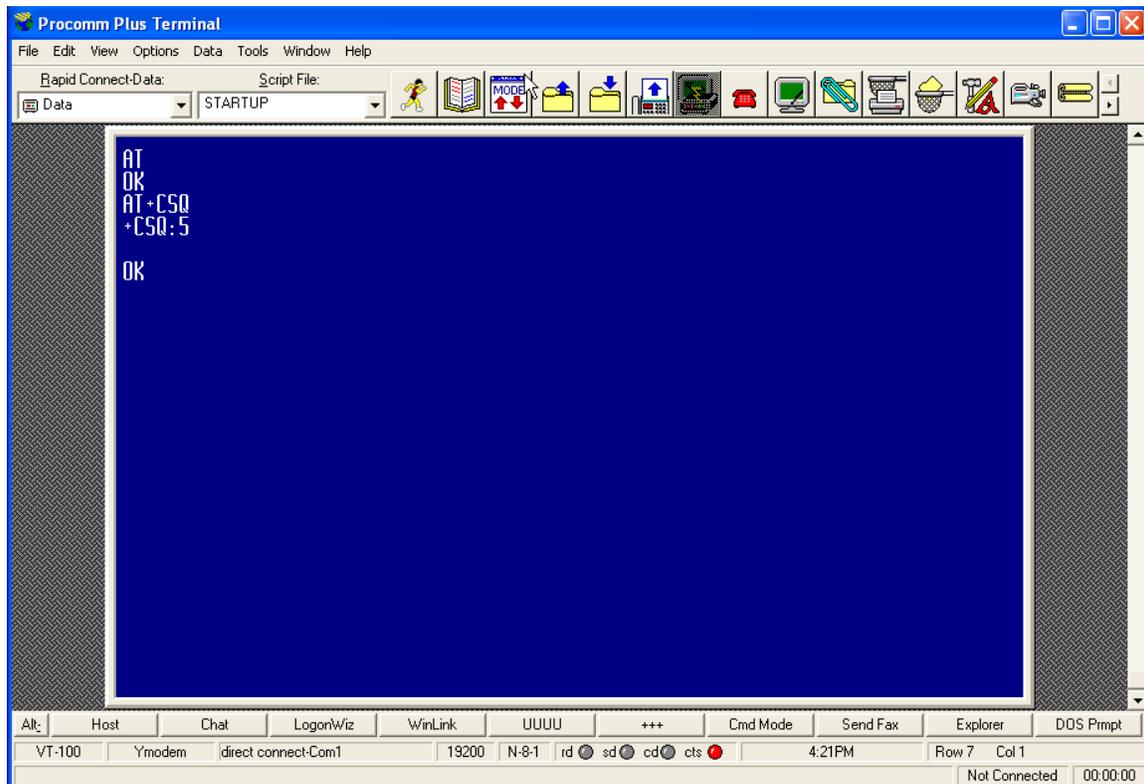


Fig. 5. Procomm screen after sending the `AT+CSQ` command

This indicates the strength of the Iridium signal. A number between 3 and 5 is acceptable, and the system should work fine. Please note the signal strength value and repeat this step five times. If the number is consistently between 3 and 5, then no further testing is needed. However, if the number is lower than 3, check that all connections are good and not corroded. Replace any bad components, and repeat the signal check step (Fig.5).

After getting acceptable signal strengths, exit Procomm and reconnect the RS232 cable to the DCP.

As a final check, contact CIL/PIL personnel and have them connect to the station using the Iridium modem dial-up connection.

(Note: When the modem receives the `AT+CSQ` command, it obtains the signal strength from the first satellite it detects. During normal operation it seeks out the satellite with the strongest signal before making a connection.)

Checking the settings on the Time Delayed Repeating Relay (TDRR)

Systems that were upgraded after June 2008 include power cycling; this is a requirement of the manufacturer. Power is cycled off for ~40 seconds every 23.5 hours. The relay is set in the normally closed mode. The timing settings are:

Set the ON Time Min/Max to almost MAX and to E (Fig. 6 and Fig. 7)
(This setting corresponds to ~40 seconds power off to the modem.)

Set the OFF Time MIN/MAX to almost MAX and set to P (Fig. 6 and Fig 7)
(This setting corresponds to ~23.5 hours power on to the modem.)



Fig. 6. Time-Delayed repeating relay settings

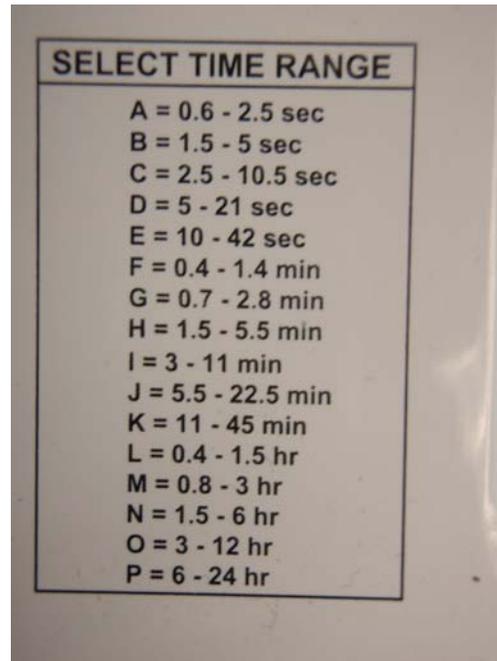


Fig. 7. Relay settings chart (on side of relay)

Once the preceding items have been checked, replace the desiccant in the enclosure. The service for the A3LA modems is complete.



Annual Inspection Checklist for Dial-up Iridium Modem

REV 1.2
05/04/2009

Station Name	<input type="text"/>	Station Number	<input type="text"/>
Field Party Chief	<input type="text"/>	Date Inspected	<input type="text"/>
Field Party	<input type="text"/>		

Comments:

System Inspection (Check for loose wires, connections)

IMEI Number	<input type="text"/>	DCP Number (dcp1/dcp2/dcp3)	<input type="text"/>
Modem Telephone Number	<input type="text"/>	DCP RS-232 port number	<input type="text"/>
Battery Install Date	<input type="text"/>	Battery Voltage	<input type="text"/>

- | | | |
|---|--|---|
| <input type="checkbox"/> Antenna and mount | <input type="checkbox"/> Antenna is in clear view | <input type="checkbox"/> Solar Panels |
| <input type="checkbox"/> Antenna cable | <input type="checkbox"/> RS232 Terminal Block | <input type="checkbox"/> Solar Regulators |
| <input type="checkbox"/> Desiccant Replaced | <input type="checkbox"/> Time Delayed Relays Checked | |

AT+CSQ Check (avg of 5 readings) csq value 0=bad, 1-2=poor, 3=good, 4-5=very good

Communication Check by ARO/PRO (who and date)

Comments: