APPLICATION NOTE 068b

TITLE: <u>Fault Detection of Point to Point Radios</u>

This application note describes several techniques to verify point to point radio operation in the field with minimal test equipment.

Before testing radios:

- Check that the antenna has not been damaged.
- If an antenna feed cable is used, visually check the cable for damage.
- Check that the antenna connector and other connectors are free from corrosion.
- Check that the power supply is connected to a working outlet.
- Check that the green LED lights when the power is connected to the radio.

Substitution Method.

The most effective method is by substitution, provided that a complete set of spare equipment is available.

Point to Point radios are unique from each other. One of the radios functions as a network controller (Point "A") and starts with the P/N 602- or 604-, and the other functions as a remote radio (Point "B") which starts with a P/N 601- or 603-. A controller must be paired with a remote. Two controllers cannot communicate with each other, neither can two remote radios. A Point "A" radio can only communicate with a Point "B" radio.

The presumption is that the spare radio modems' configurations have been properly set, and are not in the default configuration. If not, determine the communication port characteristics of the equipment the radios are connected to. Configure the radios to match those parameters using a PC and a terminal communications program.

Substitute one of the suspected faulty radios with a radio with a similar part number; i.e., 601- with a 601- radio, etc. If communication is restored, then the faulty radio is identified. If not, put the original radio back, and repeat the procedure with the other radio. If communication is not restored, there might be failures in both radios (which is unlikely), in which case you can swap both spares. If after swapping both spares communication is not restored, the problem could either be with:
- the power supply
- the data cable
- the antenna
- some other part of the system.

Verification with only a single pair of radio modems.

If no spares exist, then the following two (2) levels of testing will be described:

1. Basic radio link test that can be performed while the equipment is in place; and
2. Data transfer tests to confirm communication port functionality.

These tests presume the system was working at one time and there has been a suspected failure. Further, there is a suspicion that the radios could be at fault.

Before testing the radios:
• Check that the antenna has not been damaged.
• If an antenna feed cable is used, visually check the cable for damage.
• Check that the antenna connector and other connectors are free from corrosion.
• Check that the power supply is connected to a working outlet.
• Check that the green LED lights when the power is connected to the radio.

TEST #1. Verification using LED's.

Each radio modem has a green LED. On the IC-15ME, it is located on the surface of the box with the antenna connector. The green LED has several functions.

• During power up, it will light and stay lit for about 2-3 seconds.
• Steady blinking indicates there is a message in the send queue of that radio.
• A rapid blinking is associated with the default (configuration) plug operation.

Background:
When one of the two radios is powered up, the green light will remain on for about 2-3 seconds, and then start blinking. The blinking is an indication that an initialization message is attempting to be sent from that radio to the second radio. Since the second radio is not on, the message remains in the send queue, and the LED continues to blink. When the second radio is turned on, its LED turns on for 2-3 seconds, both radios now communicate with each other, and each send their initialization message to the other. Consequently, the send queues are cleared, and the blinking stops.

If the radios are still connected to terminal equipment, and that terminal equipment is sending out any data to the radio, then that radio's LED will blink while data is in the send queue.

The LED test is a basic test to insure the radio's transmitter and receiver are functioning.

Disconnect the cables from the terminal equipment. Power one of the radios by connecting the cable with the power adapter to the radio. Notice the operation of the LED (steady for 2-3 seconds, then blinking). Power the second of the two radios. The second radio's LED will turn on steady for 2-3 seconds, then should stop blinking. The first radio's LED should stop blinking also.

When the LED's quit blinking, that is an indication they are communicating with each other. The test is passed. If the radio LED's remain blinking, there is most likely a problem with the radios.

TEST #2 Data Transfer Verification using two (2) PC's.

This test concentrates on verification of the communication port. Connect each radio modem to a PC. Run a communication program on the PC. If you use our program, HOST.COM, the radios should be connected to COMM 1.

Set the baud rate of the communications program to the known settings of the radios, if different than 9600 N 8 1. If HOST.COM is used, use the ALT P command.

Press the F7 & F9 function keys to disable flow control checking.

Enter the escape from data transfer sequence: <1 second> +++ <1 second>.

An "*" prompt should appear. This verifies that the baud rate settings are correct.

Repeat the same for the other radio on the second PC.

Both LED's should not be blinking.

Check the status of the radio. Type S <CR>. Status will be returned, and there should be 0 packets in the send and receive queue.

Put both radios in data transfer by typing C <CR>.

Type a character on one radio. The LED should blink once, and it should appear on the opposite screen. Type a character on the other PC, and that radio should blink, and a character should appear on the first screen.

This test verifies that the communication ports are functioning properly.