

## TS4000 Tune-up Procedure

### Introduction

Tuning up the modem board and radio board pair consists of setting the tuning adjustments on the radio transceiver and also setting the tuning adjustments of the modem board. The tuning adjustments of the TS4000 modem board and DM-3433 radio transceiver are electronically tuned. Tuning the modem board adjustments requires using the TS4000 tune-up software that interfaces to the modem board through the serial port.

### Radio Configuration

Before the modem board and radio transceiver are tuned up together, the modem board is configured for the specifics of the radio transceiver that it is connected to. This configuration sets the following radio parameters:

Maximum Radio Power - This limits the maximum power that the user can configure the radio modem for.

Frequency Range - This sets the frequency range that the radio transceiver is designed to operate over. This limits the frequencies that the radio channels can be set for.

Maximum Modulation Rate - This limits the modulation rate that the user can configure the modem for. As a result, this limits the bandwidth of the transmit signal that the radio modem produces.

### Transmit Power Tune-up

The transmit power is controlled by a DAC on the radio board. This DAC is controlled by the modem board by passing data to the microcontroller on the radio board through the SPI port.

Procedure:

- 1) Connect the radio modem to a service monitor set to measure power.
- 2) Start the TS4000 tune-up software and set it so that the radio modem transmits at the maximum power on the middle transmit frequency.
- 3) Adjust the power setting to the correct level with the tune-up software.
- 4) Set the tune-up software for a lower transmit power. Adjust the power appropriately with the tune-up software.
- 5) Repeat step 4 for all power levels (1.0W, 2.0W, 5.0W) and transmit frequencies (lowest, center and highest) defined by the tune-up software.
- 6) With the tune-up software, store the tune-up values into the modem board's non-volatile memory.

### Transmit Modulation Level Tune-up

The transmit modulation level is set controlled by the amplitude of the modulation signal sent to the radio board from the modem board.

Procedure:

- 1) Connect the radio modem to a service monitor set to monitor frequency deviation.
- 2) Start the TS4000 tune-up software and set it for the center frequency.
- 3) Using the software, adjust the deviation to the appropriate value.
- 4) Repeat step 3 for all frequencies (low, middle and high) defined by the tune-up software.
- 5) With the tune-up software, store the tune-up values into the modem board's non-volatile memory.

### Transmit Frequency Error Tune-up

The center transmit frequency error is controlled by the DC level of the modulation signal sent to the radio board from the modem board.

Procedure:

- 1) Connect the radio modem to a service monitor set to measure frequency.
- 2) Start the TS4000 tune-up software and set it so that the radio modem transmits at maximum power on the center transmit frequency.
- 3) Adjust the frequency control settings in the software so that the transmit frequency is correct.
- 4) Store the values in the modem board's non-volatile memory.