

FreeWave Technologies, Inc.

225-400MHz F-Series Transceivers User Manual Addendum

The FreeWave Technologies 225-400MHz F-Series transceivers operate in substantially the same manner as the 900 MHz and 2.4 GHz transceivers. They may be operated in Point-to-Point, Multipoint, and Repeater modes, with essentially the same parameter options.

The main difference is in the operation of the Frequency Key, and consequently setting of the frequencies used. The F-Series family of transceivers may be set up to operate in single frequency mode or as a frequency hopping transceiver, utilizing any part of or the entire 225-400 MHz band.

NOTE: All F-Series transceivers used in a network must be set to identical frequency parameters.

To set the frequencies (either single channel or frequency hopping), enter the Radio Parameters section of the transceiver's setup menu, as shown in Figure 1. (From Main Menu, select option 3. Refer to the User Manual for directions on HyperTerminal setup.)

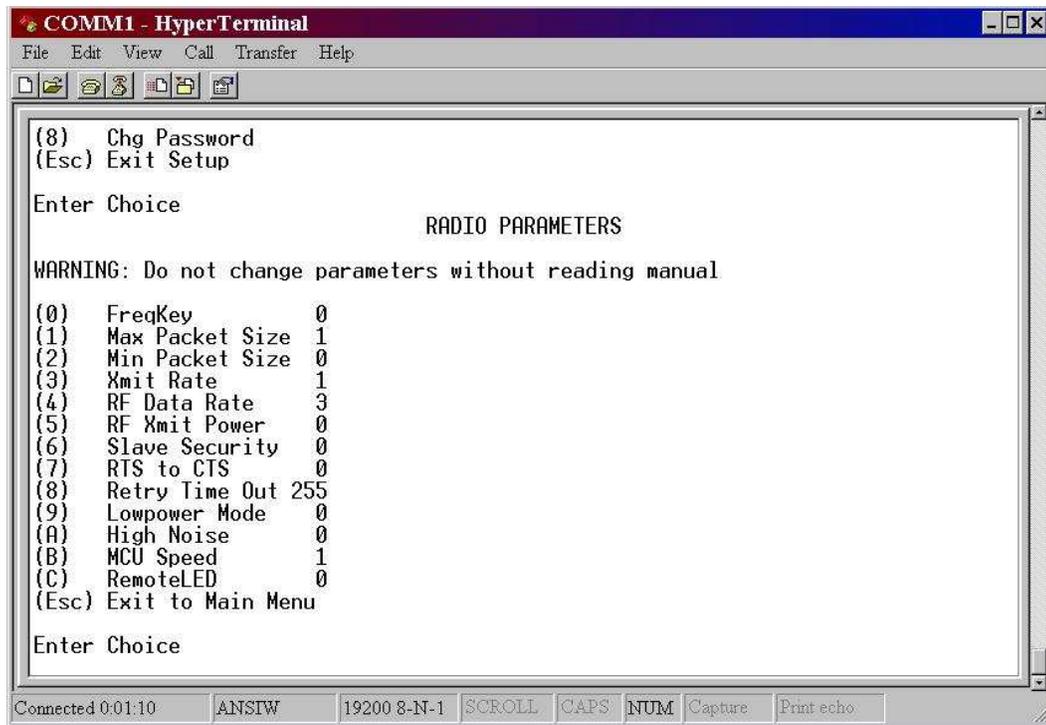


Figure 1

Operation in Frequency Hopping Mode

The F-Series family of transceivers may be set up to use anywhere from 2 to 64 frequencies when in frequency hopping mode. The transceiver can use any frequency separated by 6.25 kHz starting at 225.000 MHz through 400.000MHz.

To operate the transceiver in frequency hopping mode:

1. If the transceiver is set to single frequency mode, the FreqKey setting will read "Single Channel". To set the transceiver back to frequency hopping, choose Option "0" (FreqKey) then choose a frequency key value between 0 through 9 or A through E.
2. Set the Hop Table size (aka. Number of Hopping Channels). The Number of Hopping Channels is set by the following steps:
 - Choose "3" from the Main Menu (Edit Radio Transmission Characteristics)
 - Choose "0" from the Radio Parameters menu (FreqKey)
 - Enter "F" (for more) when prompted for a New Frequency Key. The menu in Figure 2 will appear.
 - At this point choose "2" Number of Hopping Channels, enter the number of frequencies you wish to hop across and press <Enter>.

NOTE: The default Hop Table is set in a sequential manner. That is to say, the first channel number "0" is 36000. The next channel number "1" is 36444, and so on through "63" at 64000. This pattern of sequential / equal spacing between channel numbers does not need to be adhered to. See "Definition of Frequencies" later in this manual.

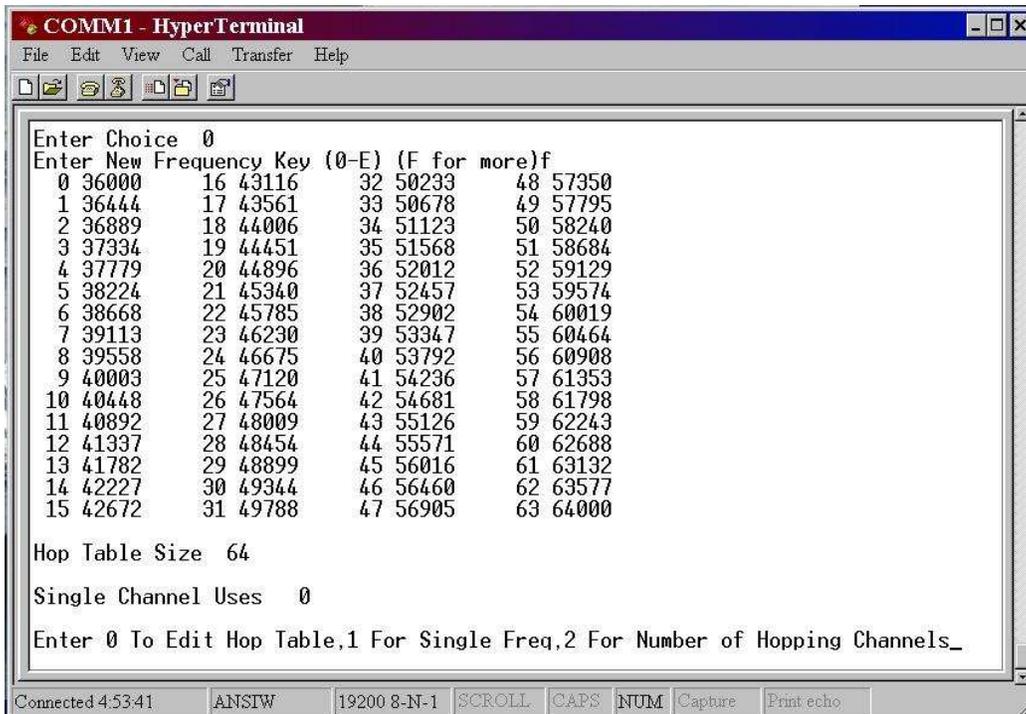


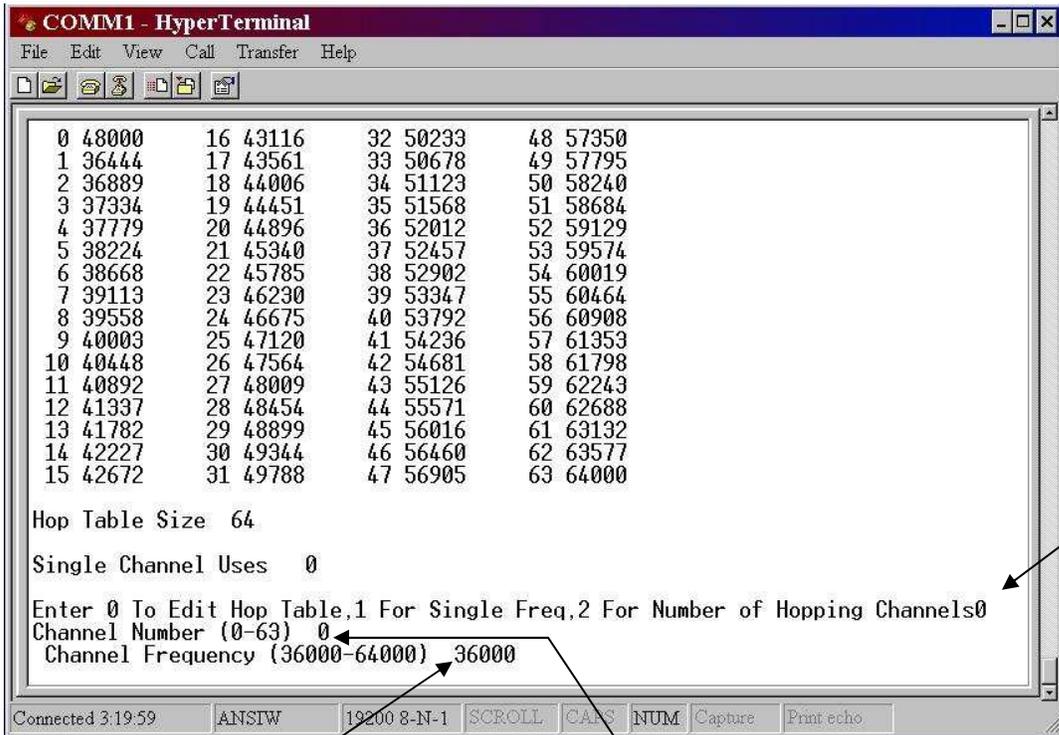
Figure 2

3. Edit the channels / frequencies for the transceiver to use.

- Choose "0" Edit Hop Table
- Choose the specific frequency to edit (Enter Frequency Number (0-63)). Then press <Enter>.
- Choose the desired channel number to use (Enter Channel Number (36000-64000)). Then press <Enter>.
- This process should be followed until all frequencies being used have been updated.

Figures 3 & 4 show the process to modify frequency 0 to use channel number 36000.

Note current value of "0" = 48000



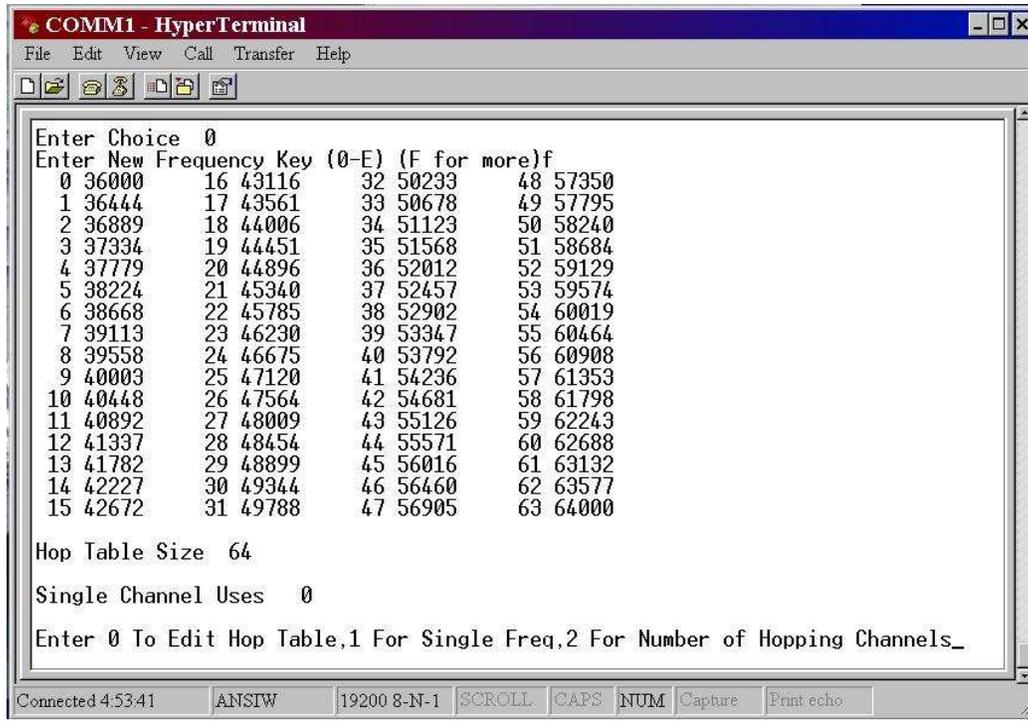
Enter "0"

Enter "36000" then press Enter

Figure 3

Enter "0" then press Enter

Note current value of "0" = 36000



The screenshot shows a HyperTerminal window titled "COMM1 - HyperTerminal". The window contains a menu for configuring a frequency hopping table. The menu items are as follows:

```
Enter Choice 0
Enter New Frequency Key (0-E) (F for more)f
0 36000    16 43116    32 50233    48 57350
1 36444    17 43561    33 50678    49 57795
2 36889    18 44006    34 51123    50 58240
3 37334    19 44451    35 51568    51 58684
4 37779    20 44896    36 52012    52 59129
5 38224    21 45340    37 52457    53 59574
6 38668    22 45785    38 52902    54 60019
7 39113    23 46230    39 53347    55 60464
8 39558    24 46675    40 53792    56 60908
9 40003    25 47120    41 54236    57 61353
10 40448   26 47564    42 54681    58 61798
11 40892   27 48009    43 55126    59 62243
12 41337   28 48454    44 55571    60 62688
13 41782   29 48899    45 56016    61 63132
14 42227   30 49344    46 56460    62 63577
15 42672   31 49788    47 56905    63 64000

Hop Table Size 64

Single Channel Uses 0

Enter 0 To Edit Hop Table,1 For Single Freq,2 For Number of Hopping Channels_
```

At the bottom of the window, there is a status bar with the following information: "Connected 4:53:41", "ANSIW", "19200 8-N-1", "SCROLL", "CAPS", "NUM", "Capture", and "Print echo".

Figure 4

Operation in Single Frequency Mode

The F-Series family of transceivers may also operate in a single frequency mode. The frequency may be selected from the default list or by setting a specific channel number and then selecting that channel.

1. To set the transceiver in single frequency mode:
 - Choose "0" from the Radio Parameters menu (FreqKey)
 - Enter "F" (for more) when prompted for a New Frequency Key. (see Figure 2)
 - Choose "1" to enable the single frequency mode.
 - Choose the channel number between 0 and 63, which will be used.

The screen will refresh, updating the Single Channel Uses value to the channel number that has just been selected. (See Figure 5)

- The FreqKey setting will read Single Channel as shown in Figure 6.

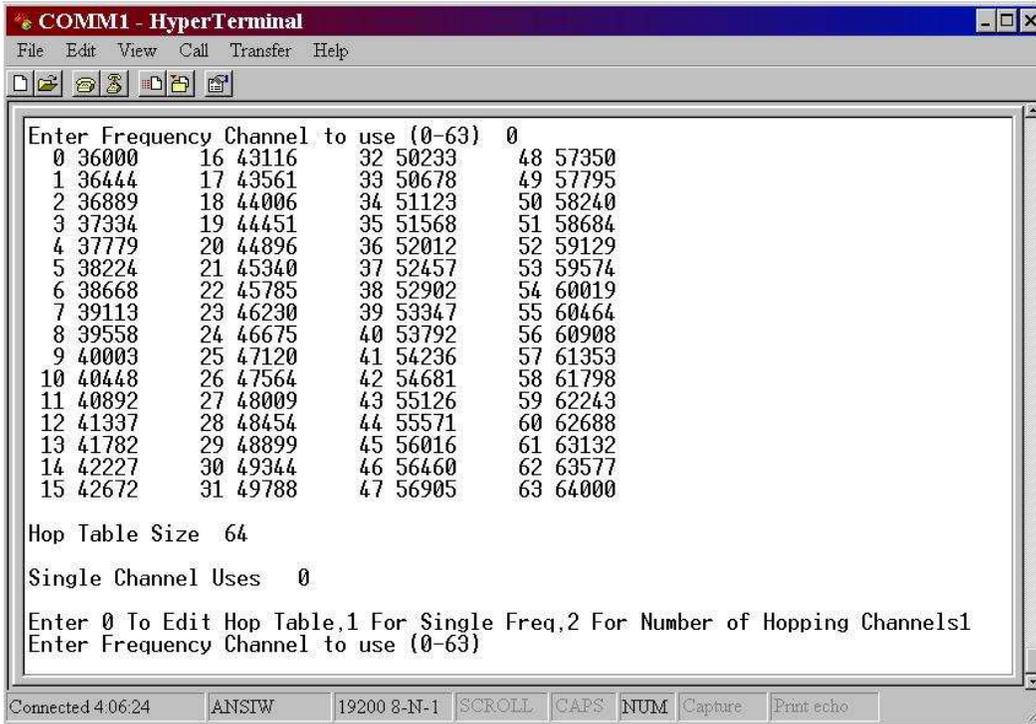


Figure 5

2. Edit the channel / frequency for the transceiver to use.
 - Choose "0" Edit Hop Table
 - Choose the specific frequency to edit (Enter Frequency Number (0-63)). Then press <Enter>.
 - Choose the channel number to use (Enter Channel Number (36000-64000)). Then press <Enter>.

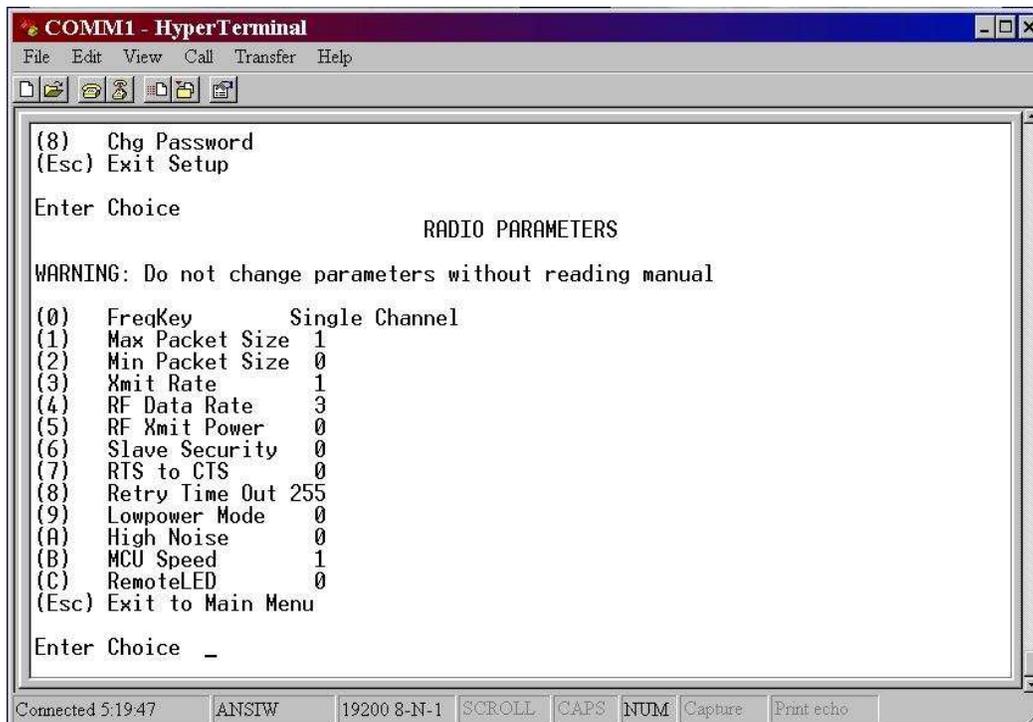


Figure 6

Definition of Frequencies

To convert the radio's channel number into a frequency in KHz, multiply the channel number by 6.25. For example, channel number 3600 corresponds to $(36,000 * 6.25) = 225,000.0$ KHz or 225.0MHz. A few more examples:

Channel 45,340 -> 283.375 MHz
Channel 54,681 -> 341.75625 MHz
Channel 64,000 -> 400.000 MHz

To perform the opposite conversion, take a frequency in kHz and divide it by 6.25. For example, the frequency 315.000MHz is channel number $(315,000 / 6.25) = 50,400$.

Other Requirements

1. The MCU Speed **must** be set to 1 for proper transceiver operation.
 - Choose option "C" from the Radio Parameters menu.
 - Choose "1" to set the MCU Speed to "high speed".

The screen will refresh to show the updated value.