

Application Note: Customizing Hopping Patterns for 910

1 Overview

Spectra-910 has been preprogrammed to appropriate hopping frequency range, from 902.4MHz to 927.8MHz, and the hopping patterns are preprogrammed as described in the operating manual. Patterns 0 through 61 are preprogrammed and patterns 58 through 63 are user-editable patterns. Should some channels be not available, user can use hopping pattern editor to customize his own hopping patterns. User can use keyboard to type in hopping pattern or use a text file fill in the hopping pattern.

2 Hopping Pattern

Hopping frequency of each channel can be calculated from low frequency boundary. For instance, the low boundary is 902.4MHz in this particular case. The formula of channel frequency calculation is shown as following,

$$f_n = 902.4 + (n - 1) * 0.2 \text{MHz}$$

or

$$n = (f_n - 902.4) / 0.2 + 1$$

Where, n is the channel number; f_n is the frequency of channel n. Here are some samples of channel and its corresponding frequency.

Channel No. (n)	Frequency (f_n) (MHz)
1	902.4
2	902.6
3	902.8
...	...
127	927.6

This frequency defines center frequency of communication channel frequency bandwidth. The occupied bandwidth is less than 400 KHz.



To avoid adjacent channel interference, only odd channel number or even channel number should be picked in a hopping pattern.

2.1 Pattern Editor

In Spectra-910 command mode, user can use AT&H command to enter into a hopping pattern editor. Hopping patterns can be viewed or edited in this hopping pattern editor.

2.2 View

Patterns 0 through 61 are preprogrammed. User can view these patterns using view command in hopping pattern editor. Once pattern 62 and 63 are defined by user, they can be viewed as well, otherwise there will be no data for these two hopping pattern. In command mode, enter AT command,



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AT&H<ENTER>

Enter a pattern number

ESC to exit

Hop pattern: 61 <ENTER>

To edit enter E, to view - V, to go back - ESC

Command : V <ENTER>

14	54	26	56	16	64	12	30	6	68
22	92	4	18	28	96	98	40	62	38
84	58	72	46	60	86	44	48	24	82
32	74	78	10	50	36	66	88	100	94
90	80	42	76	52	20	2	8	34	70

Checksum = 7787

Enter a pattern number

ESC to exit

Hop pattern

It can be learnt, from the information shown above, there are exact **50** channels for each hopping pattern.

2.3 Edit

While patterns **58 through 63** can be redefined by user, others are fixed in the system. User can define his own hopping patterns using edit command in hopping pattern editor. For each pattern, there should be exact **50** channels entered, otherwise the pattern can not be created successfully. Again, only odd channel number or even number should be entered within one certain hopping pattern to avoid adjacent channel interference.

AT&H<ENTER>

Enter a pattern number

ESC to exit

Hop pattern: 62 <ENTER>

To edit enter E, to view - V, to go back - ESC

Command: V <ENTER>

This pattern is not programmed

Enter a pattern number

ESC to exit

Hop pattern: 62 <ENTER>

To edit enter E, to view - V, to go back - ESC

Command: E <ENTER>

Enter channels.

ESC to exit.

5<ENTER> 7<ENTER> 9<ENTER> 11<ENTER> 13<ENTER> 15<ENTER> 17<ENTER> 19<ENTER> 21<ENTER> 23<ENTER>
 25<ENTER> 27<ENTER> 29<ENTER> 31<ENTER> 33<ENTER> 35<ENTER> 37<ENTER> 39<ENTER> 41<ENTER> 43<ENTER>
 45<ENTER> 47<ENTER> 49<ENTER> 51<ENTER> 53<ENTER> 55<ENTER> 57<ENTER> 59<ENTER> 61<ENTER> 63<ENTER>
 65<ENTER> 67<ENTER> 69<ENTER> 71<ENTER> 73<ENTER> 75<ENTER> 77<ENTER> 79<ENTER> 81<ENTER> 83<ENTER>
 85<ENTER> 87<ENTER> 89<ENTER> 91<ENTER> 93<ENTER> 95<ENTER> 97<ENTER> 99<ENTER> 101<ENTER> 103<ENTER>



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5	7	9	11	13	15	17	19	21	23
25	27	29	31	33	35	37	39	41	43
45	47	49	51	53	55	57	59	61	63
65	67	69	71	73	75	77	79	81	83
85	87	89	91	93	95	97	99	101	103

Checksum = 2EDF
 Enter a pattern number
 ESC to exit
 Hop pattern:

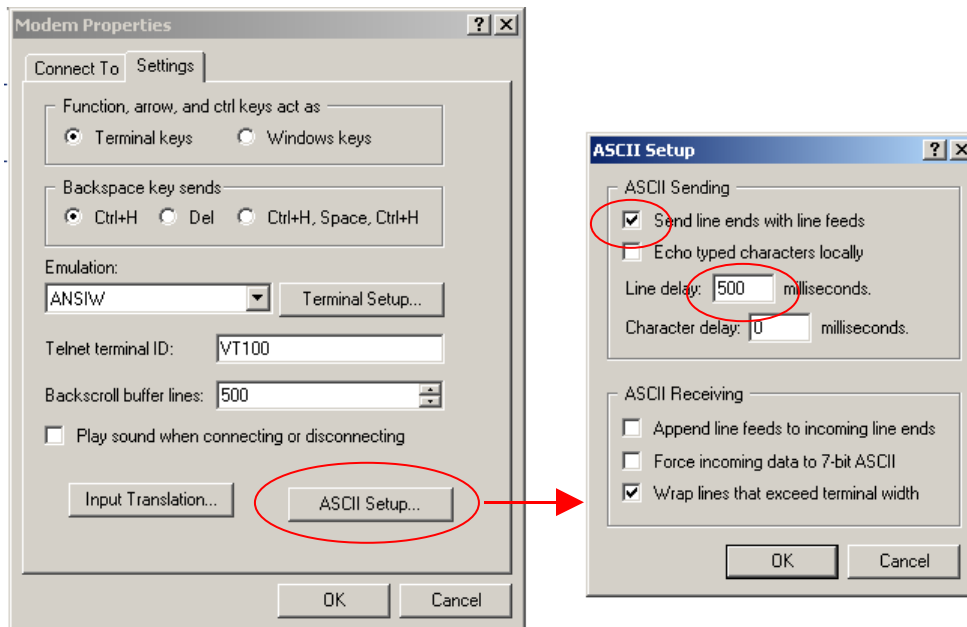
Use “View” command in hopping pattern editor to check the pattern just created.



Remember to set appropriate hopping patterns in S register S106 and S206. When this is done, the Spectra-910 will only use these user requested channels for each hopping.



In order to input correctly in Hyperterminal, proper settings have to be in place.





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2.4 Script

This section describes how to use a text file to input the user defined frequency hopping pattern.

2.4.1 Text File

Prepare a text file as the format shown in following, per channel each line, totally 50 lines.

```
5
7
9
11
13
...
103
```

2.4.2 Commands

Hopping pattern edit command is still same. The following command will get ready to send the text file as input for hopping pattern.

AT&H<ENTER>

Enter a pattern number
ESC to exit
Hop pattern: 62 <ENTER>

To edit enter E, to view - V, to go back - ESC
Command: E <ENTER>
Enter channels.
ESC to exit.

At this point, the text file should be selected and sent to the modem from Hyperterminal. Refer to the screen snapshot.



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Once the text file with the format described above is selected, the modem will accept the data as a hopping pattern. Here is the output from the modem.

```

5   7   9   11  13  15  17  19  21  23
25  27  29  31  33  35  37  39  41  43
45  47  49  51  53  55  57  59  61  63
65  67  69  71  73  75  77  79  81  83
85  87  89  91  93  95  97  99  101 103

```

```

Checksum = 2EDF
Enter a pattern number
ESC to exit
Hop pattern :

```

Remember to save the hopping pattern with command AT&W.