ADCON
RF TECHNOLOGY

Date : 17/05/2001

Frequency Hopping for B900SS-20

The radio module B900SS-20 uses a spread spectrum code with frequency hopping. The module changes channel (and frequency) at each period "Dwell Timer" and has 50 different frequencies.

The first channel, named "Channel 0" is at 902.8 MHz, the last channel named "Channel 49" is at 910.15 MHz. Channel spacing is 150 KHz. The sequence of hopping is saved in 8 tables, every table has a pseudo-random sequence of channels, where all channels are used only once.

The different tables are :

Table 1: 16, 23, 30, 37, 44, 0, 49, 42, 35, 28, 21, 14, 7, 5, 12, 19, 26, 33, 40, 47, 45, 38, 31, 24,3, 17,10, 1, 8, 15, 22, 29, 36, 43, 48, 41, 34, 27, 20, 13, 6, 4, 11, 18, 25, 32, 39, 46, 2, 9.

Table 2: 31, 48, 32, 1, 2, 4, 8, 16, 33, 3, 6, 12, 24, 49, 34, 5, 10, 20, 41, 19, 39, 15, 30, 40, 17,35, 7, 14, 28, 0, 36, 9, 18, 37, 11, 22, 45, 27, 46, 29, 44, 25, 38, 13, 26, 42, 21, 43, 23, 47.

Table 3: 14, 27, 40, 39, 26, 13, 3, 16, 29, 42, 38, 25, 12, 0, 11, 24, 37, 49, 36, 23, 10, 4, 17, 30, 43, 48, 35, 22, 9, 2, 15, 28, 41, 47, 34, 21, 8, 1, 5, 18, 31, 44, 46, 33, 20, 7, 6, 19, 32,45.

Table 4: 2, 18, 34, 39, 23, 7, 3, 19, 35, 40, 47, 22, 20, 36, 28, 44, 38, 30, 13, 8, 6, 4, 9, 25, 41, 5, 21, 37, 24, 10, 26, 45, 42, 33, 15, 0, 11, 27, 43, 29, 12, 1, 14, 46, 31, 16, 32, 48, 17, 49.

Table 5: 47, 24, 48, 18, 35, 25, 30, 32, 46, 20, 34, 19, 16, 10, 44, 23, 42, 0, 41, 31, 8, 14, 28, 27, 15, 12, 21, 36, 22, 1, 43, 13, 6, 45, 39, 17, 37, 38, 9, 3, 33, 11, 26, 7, 49, 4, 29, 2, 5, 40.

Table 6: 39, 31, 49, 10, 2, 40, 11, 26, 47, 16, 14, 17, 9, 43, 3, 45, 41, 12, 30, 37, 44, 6, 23, 24, 8, 25, 20, 46, 29, 42, 15, 35, 22, 48, 34, 13, 21, 32, 18, 36, 19, 5, 27, 4, 1, 28, 38, 7, 33, 0.

Table 7: 42, 9, 41, 5, 38, 47, 3, 24, 7, 16, 32, 8, 27, 34, 25, 46, 19, 26, 49, 22, 36, 10, 13, 17, 14, 43, 1, 2, 35, 48, 20, 28, 15, 45, 30, 11, 23, 37, 29, 18, 39, 0, 40, 6, 21, 33, 4, 12, 31, 44.

Table 8: 44, 8, 11, 36, 17, 7, 49, 1, 47, 14, 43, 18, 10, 5, 20, 2, 29, 0, 30, 46, 21, 3, 22, 28, 37,19, 39, 27, 4, 40, 16, 45, 34, 15, 35, 12, 31, 23, 41, 6, 38, 26, 33, 25, 42, 32, 9, 24, 13, 31.

Extra Table : 15, 30, 17, 34, 11, 22, 44, 29, 41, 39, 31, 33, 7, 14, 28, 9, 18, 36, 19, 38, 27, 45, 49, 13, 26, 37, 23, 46, 25, 50, 21, 42, 43, 47, 1, 2, 4, 8, 16, 32, 3, 6, 12, 24, 48, 5, 10, 20, 40,35.

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The length of period named "Dwell Timer" is function of the number of clients in the network. For 1 client, the Dwell Timer is 103 mS. Each Client adds 5 mS at this time. The maximum of clients in a network is 16. With this information, we can see that the 50 channels can be active for minimum 103 mS every 5,15 seconds and maximum 178 mS every 9,15 seconds.

In a Channel, the maximum Radio Emission time for all Radio Modems is:

- If data sending Client to Server : 18 mS for the Server and 56 mS for the Client. Total : 74 mS.
- If data sending Server to Client : 51 mS for the Server and 14 mS for the Client. Total : 65 mS.

Finally, the 50 channels can have a maximum radio emission time 74 mS every 5,15 seconds (for a network with 1 Client) or 9,15 seconds (for a network with 16 Clients).

The Dwell Timer is in emission only if data is sent by the Client or the Server. When a long frame is sent by the Client or the Server, the frame is truncated in "little" frames of 130 bytes maximum. Every "little" frame is sent to the radio on a different channel.

Exemple : if a frame of 520 bytes is sent by the Client or the Server, and the radio is actually on the Table N°4, position 5 (channel 23), data are truncated in 4 "little" frames and sent on channels 7, 3, 19 and 35, respectively at the positions 6, 7, 8 and 9 of the table N°4.

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