

The Home Base uses a random number generator to generate the random hop table. It uses 50 channels separated by 500KHz when using the 250KHz mode and it uses 100 channels separated by 250KHz when it uses the 125KHz mode. During the random number generation, the Home Base checks to make sure that 2 channels are not repeated in a 10 second period when using the 250KHz mode and that 2 channels are not repeated in a 20 second period when using the 125KHz mode. If channels are repeated, it selects another random channel until it meets the condition.

The Iota device needs to be synchronized with the Home Base frequency hop table so that it can transmit data to the Home Base. The Iota uses the same random number generator as the Home Base, so it only needs to know the Home Base random number seed in order to generate the same hop table. In order to do this, the Home Base transmits its random number generator seed over an advertisement channel every 10 seconds. The advertisement channel is a 500KHz wide channel so it doesn't need to frequency hop. The Iota listens on this advertisement channel and listens for the random seed. Once the Iota has the random seed it can use this to communicate with the Home Base over the 125KHz or 250KHz channels whichever one is being used.

The random seed is incremented by 1 every 10 seconds by the Home Base so that new random numbers are generated every 10 seconds.

Below are example hop patterns for the case when we are using 250KHz wide signals and hop channels are separated by 500KHz. Each row represents the channels being used over a 10 second period. The channel dwell time is less than 0.4 seconds.

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