Claims

What is claimed is:

1. A method to operate a wireless device ~~in an ad hoc network~~, comprising:

~~transmitting and receiving discovery information by the wireless device during a discovery window of a periodic discovery interval; and~~

~~operating the wireless device in a power save mode during an inactive portion of the periodic discovery interval.~~ performing passive discovery operations on a discovery channel by the wireless device during a discovery window of a periodic discovery interval, the passive discovery operations enabling discovery by neighbor wireless devices and discovering neighbor wireless devices passively;

switching from the discovery channel to a data channel when the discovery window of the periodic discovery interval ends;

sending a data announcement packet on the data channel during a data window of the periodic discovery interval;

sending data on the data channel during the data window of the periodic discovery interval following transmission of the data announcement packet;

operating the wireless device, during the periodic discovery interval, with a short data transfer window followed by a power save mode, in which a radio of the wireless device is turned off, when a power save data transfer mode is selected;

operating the wireless device, during the periodic discovery interval, with a long data window when a high speed data transfer mode is selected; and

alternating between the discovery channel used for the discovery window and the data channel used for the data window, wherein passive discovery and data transfer are performed concurrently, and power is saved when the power save data transfer mode is selected.

2. A method as defined in claim 1, further comprising:

turning on a radio of the wireless device in response to activation of wireless operation;

listening for a beacon packet for a specified time;

if a beacon packet is received in the specified time, adjusting timing of the discovery window in accordance with parameters in the received beacon packet; and

if a beacon packet is not received in the specified time, sending a beacon packet.

3. A method as defined in claim 1, further comprising:

turning on a radio of the wireless device during the discovery window, in response to activation of a passive discovery mode;

listening for a beacon packet for a random back-off time;

if a beacon packet is received within the random back-off time, adjusting timing of the discovery window in accordance with parameters in the received beacon packet;

if a beacon packet is not received within the random back-off time, sending a beacon packet;

listening for a probe request packet during the discovery window;

saving information relating to received probe request packets; and

sending a probe response packet if the wireless device has not sent a probe response packet or a beacon packet in the current discovery window.

4. A method as defined in claim 1, further comprising:

turning on a radio of the wireless device during the discovery window, in response to activation of an active discovery mode;

sending a broadcast request packet during the discovery window; and

saving information contained in response packets sent by other wireless devices in response to the broadcast request packet.

5. A method as defined in claim 1, further comprising:

turning on a radio of the wireless device during the discovery window, in response to a connect call;

sending a connection request packet to a second wireless device during the discovery window;

if a connection response packet is received within the discovery window, establishing a connection to the second wireless device; and

if a connection response packet is not received within the discovery window, indicating a connection failure.

6. A method as defined in claim 1, further comprising:

receiving a connection request packet by the wireless device during the discovery window;

if the connection request packet is accepted, sending a connection response packet during the discovery window; and

if the connection request packet is not accepted, dropping the connection request packet and remaining in a current state.

7. A method as defined in claim 1, wherein the data includes music data for a portable media player device~~further comprising:~~

~~performing discovery operations to discover neighbor wireless devices during a discovery window;~~

~~sending a data announcement packet during a data window of the periodic discovery interval; and~~

~~sending data during the data window following transmission of the data announcement packet~~.

8. A wireless portable media player device comprising:

a portable media player;

a radio to permit wireless operation; and

a wireless module logically connected to the portable media player and to the radio to operate the wireless portable media player device ~~in an ad hoc network~~, the wireless module comprising a processor programmed with instructions for:

~~transmitting and receiving discovery information during a discovery window of a periodic discovery interval; and~~

~~operating in a power save mode during an inactive portion of the periodic discovery interval.~~ performing passive discovery operations on a discovery channel during a discovery window of a periodic discovery interval, the passive discovery operations enabling discovery by neighbor wireless devices and discovering neighbor wireless devices passively;

switching from the discovery channel to a data channel when the discovery window of the periodic discovery interval ends;

sending a data announcement packet on the data channel during a data window of the periodic discovery interval;

sending data on the data channel during the data window of the periodic discovery interval following transmission of the data announcement packet;

operating the wireless portable media player device, during the periodic discovery interval, with a short data transfer window followed by a power save mode, in which the radio is turned off, when a power save data transfer mode is selected;

operating the wireless portable media player device, during the periodic discovery interval, with a long data window when a high speed data transfer mode is selected; and

alternating between the discovery channel used for the discovery window and the data channel used for the data window, wherein passive discovery and data transfer are performed concurrently, and power is saved when the power save data transfer mode is selected.

9. A wireless portable media player device as defined in claim 8, wherein the instructions further include instructions for:

turning on the radio in response to activation of wireless operation;

listening for a beacon packet for a specified time;

if a beacon packet is received in the specified time, adjusting timing of the discovery window in accordance with parameters in the received beacon packet; and

if a beacon packet is not received in the specified time, sending a beacon packet.

10. A wireless portable media player device as defined in claim 8, wherein the instructions further include instructions for:

turning on the radio during the discovery window, in response to activation of a passive discovery mode;

listening for a beacon packet for a random back-off time;

if a beacon packet is received within the random back-off time, adjusting timing of the discovery window in accordance with parameters in the received beacon packet;

if a beacon packet is not received within the random back-off time, sending a beacon packet;

listening for a probe request packet during the discovery window;

saving information relating to received probe request packets; and

sending a probe response packet if the wireless device has not sent a probe response packet or a beacon packet in the current discovery window.

11. A wireless portable media player device as defined in claim 8, wherein the instructions further include instructions for:

turning on the radio during the discovery window, in response to activation of an active discovery mode;

sending a broadcast request packet during the discovery window; and

saving information contained in response packets sent by other wireless devices in response to the broadcast request packet.

12. A wireless portable media player device as defined in claim 8, wherein the instructions further include instructions for:

turning on the radio during the discovery window, in response to a connect call;

sending a connection request packet to a second wireless device during the discovery window;

if a connection response packet is received within the discovery window, establishing a connection to the second wireless device; and

if a connection response packet is not received within the discovery window, indicating a connection failure.

13. A wireless portable media player device as defined in claim 8, wherein the instructions further include instructions for:

receiving a connection request packet during the discovery window;

if the connection request packet is accepted, sending a connection response packet during the discovery window; and

if the connection request packet is not accepted, dropping the connection request packet and remaining in a current state.

14. A wireless portable media player device as defined in claim 8, wherein the data includes music data for the portable media player device~~instructions further include instructions for:~~

~~performing discovery operations to discover neighbor wireless devices during a discovery window;~~

~~sending a data announcement packet during a data window of the periodic discovery interval; and~~

~~sending data during the data window following transmission of the data announcement packet~~.

15. A computer-readable storage device ~~medium~~ programmed with instructions for executing a method to operate a wireless device ~~in an ad hoc network~~, comprising:

~~transmitting and receiving discovery information by the wireless device during a discovery window of a periodic discovery interval; and~~

~~operating the wireless device in a power save mode during an inactive portion of the periodic discovery interval.~~ performing passive discovery operations on a discovery channel by the wireless device during a discovery window of a periodic discovery interval, the passive discovery operations enabling discovery by neighbor wireless devices and discovering neighbor wireless devices passively;

switching from the discovery channel to a data channel when the discovery window of the periodic discovery interval ends;

sending a data announcement packet on the data channel during a data window of the periodic discovery interval;

sending data on the data channel during the data window of the periodic discovery interval following transmission of the data announcement packet;

operating the wireless device, during the periodic discovery interval, with a short data transfer window followed by a power save mode, in which a radio of the wireless device is turned off, when a power save data transfer mode is selected;

operating the wireless device, during the periodic discovery interval, with a long data window when a high speed data transfer mode is selected; and

alternating between the discovery channel used for the discovery window and the data channel used for the data window, wherein passive discovery and data transfer are performed concurrently, and power is saved when the power save data transfer mode is selected.

16. A computer-readable storage device ~~medium~~ as defined in claim 15, wherein the method further comprises:

turning on a radio of the wireless device in response to activation of wireless operation;

listening for a beacon packet for a specified time;

if a beacon packet is received in the specified time, adjusting timing of the discovery window in accordance with parameters in the received beacon packet; and

if a beacon packet is not received in the specified time, sending a beacon packet.

17. A computer-readable storage device ~~medium~~ as defined in claim 15, wherein the method further comprises:

turning on a radio of the wireless device during the discovery window, in response to activation of a passive discovery mode;

listening for a beacon packet for a random back-off time;

if a beacon packet is received within the random back-off time, adjusting timing of the discovery window in accordance with parameters in the received beacon packet;

if a beacon packet is not received within the random back-off time, sending a beacon packet;

listening for a probe request packet during the discovery window;

saving information relating to received probe request packets; and

sending a probe response packet if the wireless device has not sent a probe response packet or a beacon packet in the current discovery window.

18. A computer-readable storage device ~~medium~~ as defined in claim 15, wherein the method further comprises:

turning on a radio of the wireless device during the discovery window, in response to activation of an active discovery mode;

sending a broadcast request packet during the discovery window; and

saving information contained in response packets sent by other wireless devices in response to the broadcast request packet.

19. A computer-readable storage device ~~medium~~ as defined in claim 15, wherein the method further comprises:

turning on a radio of the wireless device during the discovery window, in response to a connect call;

sending a connection request packet to a second wireless device during the discovery window;

if a connection response packet is received within the discovery window, establishing a connection to the second wireless device; and

if a connection response packet is not received within the discovery window, indicating a connection failure.

20. A computer-readable storage device ~~medium~~ as defined in claim 15, wherein the data includes music data for a portable media player device ~~method further comprises:~~

~~performing discovery operations to discover neighbor wireless devices during a discovery window;~~

~~sending a data announcement packet during a data window of the periodic discovery interval; and~~

~~sending data during the data window following transmission of the data announcement packet~~.

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