CLAIMS

What is claimed is:

1. A method of autonomous operation of a storage device controller, comprising:

upon detecting a triggering event, a controller of a storage device enumerating a list of files that are candidates for deletion from storage media of the storage device, said storage media communicatively coupled to the controller, and recording a list of sectors of the storage media used to store the candidate files;

marking storage device file system directory entries for the list of enumerated files as deleted while locking out a host device for the storage device from accessing the storage media, and performing a read/modify/write sequence of those sectors of the storage media holding the directory entries;

waiting for a first host device synchronization event;

upon recognizing the first host device synchronization event, checking the list of candidate files for deletion and determining whether corresponding directory entries of the candidate files are marked deleted;

if the directory entries of the candidate files are not marked deleted, repeating the marking of directory entries as deleted, performing the read/modify/write of the sectors of the storage media holding the directory entries, and waiting for an additional first host device synchronization event; otherwise, if the directory entries of the candidate files are marked deleted, then marking orphaned sectors to prevent data storage to corresponding data storage units in the storage media but maintaining the orphaned sectors in the list of sectors, wherein the orphaned sectors are those sectors with corresponding directory entries that are marked as deleted but with corresponding data storage units in the storage media still allocated;

waiting for a further host device synchronization event and, upon recognition of same, iterating through the orphaned sectors to determine whether or not the host device subsequently wrote over the read/modify/write actions; and

if the orphaned sectors have reverted to a previous value, then repeating the marking of the orphaned sectors, waiting for the further host device synchronization event and determining whether or not the host device subsequently wrote over the read/modify/write actions, otherwise, if the orphaned sectors are still marked, allocating the list of sectors as being available to store new data and clearing the list of candidate files.

2. The method of claim 1, wherein the triggering event comprises an indication that a storage media utilization threshold has been reached or exceeded.

3. The method of claim 1, wherein the triggering event comprises a programmed action.

4. The method of claim 1, wherein the triggering event comprises a manual intervention by a user of the host device.

5. The method of claim 1, wherein the candidate files are the oldest files stored in the storage media.

6. The method of claim 1, wherein the candidate files are the least recently accessed files stored in the storage media.

7. The method of claim 1, wherein the candidate files are the least frequently accessed files stored in the storage media.

8. The method of claim 1, wherein the sector information is stored in a reserved area of the storage media.

9. The method of claim 1, wherein the first host device synchronization event comprises a power-down-then-power-up cycle of the host device.

10. The method of claim 9, wherein the first host device synchronization event is determined by the controller detecting the host device reading a partition table or master boot record and file allocation table (FAT) boot block.

11. The method of claim 9, wherein the first host device synchronization event is distinguished from another event by the controller recognizing a host device access of a file system of the storage device consistent with file system mounting operations.

12. The method of claim 1, wherein the orphaned sectors are marked using read/modify/write semantics while the host device is locked out from accessing the storage device.

13. The method of claim 1, wherein deletion processes are repeated until at least one of the following criteria is met: a deletion threshold for the storage device has been reached, a fixed number or percentage of files stored in the storage device have been deleted, or a designated percentage of storage space in the storage device has been made available for storing new files.

14. A storage device comprising a controller communicatively coupled to a host device interface and a storage media, said controller configured to, upon detecting a triggering event, enumerate a list of files that are candidates for deletion from the storage media, and record a list of sectors of the storage media used to store the candidate files; mark storage device file system directory entries for the list of enumerated files as deleted while locking out a host device coupled to the host device interface from accessing the storage media, and perform a read/modify/write sequence of those sectors of the storage media holding the directory entries; wait for a first host

device synchronization event, and upon recognizing the first host device synchronization event check the list of candidate files for deletion and determining whether corresponding directory entries of the candidate files are marked deleted; if the directory entries of the candidate files are not marked deleted, repeat the marking of directory entries as deleted, perform the read/modify/write of the sectors of the storage media holding the directory entries, and wait for an additional first host device synchronization event; otherwise, if the directory entries of the candidate files are marked deleted, then mark orphaned sectors to prevent data storage to coresponding data storage units in the storage media but maintain the orphaned sectors in the list of sectors, wherein the orphaned sectors are those sectors with corresponding directory entries that are marked as deleted but with corresponding data storage units in the storage media still allocated; wait for a further host device synchronization event and, upon recognizing same, iterate through the orphaned sectors to determine whether or not the host device subsequently wrote over the read/modify/write actions; and if the orphaned sectors have reverted to a previous value, then repeat the marking of the orphaned sectors, wait for the further host device synchronization event and determine whether or not the host device subsequently wrote over the read/modify/write actions, otherwise, if the orphaned sectors are still marked, allocate the list of sectors as being available to store new data and clear the list of candidate files.

15. The storage device of claim 14, wherein the storage device comprises a media card and the host interface comprises a digital camer interface.

16. The storage device of claim 14, wherein the triggering event comprises one of: an indication that a storage media utilization threshold has been reached or exceeded, a programmed action, or a manual intervention by a user of the host device.

17. The storage device of claim 14, wherein the candidate files are one of: the oldest files stored in the storage media, the least recently accessed files stored in the storage media, or the least frequently accessed files stored in the storage media.

18. The storage device of claim 14, wherein the first host device synchronization event comprises a power-down-then-power-up cycle of the host device.

19. The storage device of claim 14, wherein the controller is configured to recognize the first host device synchronization event by recognizing a host device access of a file system of the storage device consistent with file system mounting operations.

20. The storage device of claim 14, wherein the controller is configured to perform deletion processes until at least one of the following criteria is met: a deletion threshold for the storage device has been reached, a fixed number or percentage of files stored in the storage device have been deleted, or a designated percentage of storage space in the storage device has been made available for storing new files

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marking storage device file system directory entries for the list of enumerated files as deleted while locking out a host device for the storage device from accessing the storage media, and performing a read/modify/write sequence of those sectors of the storage media holding the directory entries;

waiting for a first host device synchronization event;

upon recognizing the first host device synchronization event, checking the list of candidate files for deletion and determining whether corresponding directory entries of the candidate files are marked deleted:

if the directory entries of the candidate files are not marked deleted, repeating the marking of directory entries as deleted, performing the read/modify/write of the sectors of the storage media holding the directory entries, and waiting for an additional first host device synchronization event; otherwise, if the directory entries of the candidate files are marked deleted, then marking orphaned sectors to prevent data storage to coresponding data storage units in the storage media but maintaining the orphaned sectors in the list of sectors, wherein the orphaned sectors are those sectors with corresponding directory entries that are marked as deleted but with corresponding data storage units in the storage media still allocated;

waiting for a further host device synchronization event and, upon recognition of same, iterating through the orphaned sectors to determine whether or not the host device subsequently wrote over the read/modify/write actions; and

if the orphaned sectors have reverted to a previous value, then repeating the marking of the orphaned sectors, waiting for the further host device synchronization event and determining whether or not the host device subsequently wrote over the read/modify/write actions, otherwise, if the orphaned sectors are still marked, allocating the list of sectors as being available to store new data and clearing the list of candidate files.

2. The method of claim 1, wherein the triggering event comprises an indication that a storage media utilization threshold has been reached or exceeded.

3. The method of claim 1, wherein the triggering event comprises a programmed action.

4. The method of claim 1, wherein the triggering event comprises a manual intervention by a user of the host device.

5. The method of claim 1, wherein the candidate files are the oldest files stored in the storage media.

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8. The method of claim 1, wherein the sector information is stored in a reserved area of the storage media.

9. The method of claim 1, wherein the first host device synchronization event comprises a power-down-then-power-up cycle of the host device.

10. The method of claim 9, wherein the first host device synchronization event is determined by the controller detecting the host device reading a partition table or master boot record and file allocation table (FAT) boot block.

11. The method of claim 9, wherein the first host device synchronization event is distinguished from another event by the controller recognizing a host device access of a file system of the storage device consistent with file system mounting operations.

12. The method of claim 1, wherein the orphaned sectors are marked using read/modify/write semantics while the host device is locked out from accessing the storage device.

13. The method of claim 1, wherein deletion processes are repeated until at least one of the following criteria is met: a deletion threshold for the storage device has been reached, a fixed number or percentage of files stored in the storage device have been deleted, or a designated percentage of storage space in the storage device has been made available for storing new files.

14. A storage device comprising a controller communicatively coupled to a host device interface and a storage media, said controller configured to, upon detecting a triggering event, enumerate a list of files that are candidates for deletion from the storage media, and record a list of sectors of the storage media used to store the candidate files; mark storage device file system directory entries for the list of enumerated files as deleted while locking out a host device coupled to the host device interface from accessing the storage media, and perform a read/modify/write sequence of those sectors of the storage media holding the directory entries; wait for a first host

device synchronization event, and upon recognizing the first host device synchronization event check the list of candidate files for deletion and determining whether corresponding directory entries of the candidate files are marked deleted; if the directory entries of the candidate files are not marked deleted, repeat the marking of directory entries as deleted, perform the read/modify/write of the sectors of the storage media holding the directory entries, and wait for an additional first host device synchronization event; otherwise, if the directory entries of the candidate files are marked deleted, then mark orphaned sectors to prevent data storage to coresponding data storage units in the storage media but maintain the orphaned sectors in the list of sectors, wherein the orphaned sectors are those sectors with corresponding directory entries that are marked as deleted but with corresponding data storage units in the storage media still allocated; wait for a further host device synchronization event and, upon recognizing same, iterate through the orphaned sectors to determine whether or not the host device subsequently wrote over the read/modify/write actions; and if the orphaned sectors have reverted to a previous value, then repeat the marking of the orphaned sectors, wait for the further host device synchronization event and determine whether or not the host device subsequently wrote over the read/modify/write actions, otherwise, if the orphaned sectors are still marked, allocate the list of sectors as being available to store new data and clear the list of candidate files.

15. The storage device of claim 14, wherein the storage device comprises a media card and the host interface comprises a digital camer interface.

16. The storage device of claim 14, wherein the triggering event comprises one of: an indication that a storage media utilization threshold has been reached or exceeded, a programmed action, or a manual intervention by a user of the host device.

17. The storage device of claim 14, wherein the candidate files are one of: the oldest files stored in the storage media, the least recently accessed files stored in the storage media, or the least frequently accessed files stored in the storage media.

18. The storage device of claim 14, wherein the first host device synchronization event comprises a power-down-then-power-up cycle of the host device.

19. The storage device of claim 14, wherein the controller is configured to recognize the first host device synchronization event by recognizing a host device access of a file system of the storage device consistent with file system mounting operations.

20. The storage device of claim 14, wherein the controller is configured to perform deletion processes until at least one of the following criteria is met: a deletion threshold for the storage device has been reached, a fixed number or percentage of files stored in the storage device have been deleted, or a designated percentage of storage space in the storage device has been made available for storing new files