To: **T10 Committee**
From: **Steve Jerman (**steve_jerman@hp.com**), HP**
  Ian Crighton (ian_crighton@hp.com **),HP**
  Vu Doan (vu_doan@asd.sel.sony.com**) , Sony**
  Yoshihisa Takayama (yoshihisa_takayama@strg.sony.co.jp**), Sony**
  Goldie Sandhu (Goldie_Sandhu@asd.sel.sony.com **), Sony**
  Kyle Walczak (Kyle.Walczak@COMPAQ.com **),Compaq**
Subject: **Proposed Addition of Read and Write Attribute Commands to SPC-2**
Date: **22-Oct-99**

There are an increasing number of storage devices and media types coming to market that incorporate small memory components which do not form part of the main data storage function. Examples of this include Media Memory on LTO tape drive media and AIT Memory In Cartridge, and device usage information stored in E^2PROMs inside tape drives. For the purposes of this proposal, such storage components are generically referred to as *Auxiliary Memory*.

Currently there is no uniform method to access the data stored on Auxiliary Memory. Several manufacturers have launched proprietary standards for various technologies, but the lack of a standardized approach is hampering their widespread acceptance. This proposal outlines new SCSI commands and a common attribute data format that will allow any host system to access and interpret data stored on Auxiliary Memory. Since the commands are considered generic, SPC seems the appropriate place to put them.

For general usage, 16 Byte CDBs have been defined for both commands.

For compatibility with older SCSI systems, 12 Byte CDBs have been defined as well. These would be applicable to Media Changers and Tape Drives. Please suggest suitable OpCodes for these commands.

The other 'external' requirement is a new ASC/ASQ ' AUXILARY MEMORY NOT ACCESSIBLE '.

7.XX WRITE ATTRIBUTE command

The WRITE ATTRIBUTE command allows an Application Client to write Attribute parameter data to Auxiliary Memory (AM) which is a memory component that accessible to the Device Server. This memory is usually non-volatile and independent of the main function of the Device Server, an example of this would be Media Auxiliary Memory on a piece of media.

Device Servers that implement the WRITE ATTRIBUTE commands shall also implement the READ ATTRIBUTE command.

Application Clients should issue READ ATTRIBUTE commands prior to using this command to discover the Auxiliary Memories that are accessible by the Device Server.

16 Byte Command

Byte	Bit							
	7	6	5	4	3	2	1	0
0	OPCODE (8Ah)							
1	Reserved (0)				ELEMENT TYPE CODE			
2	ELEMENT ADDRESS							
3								
4	VOLUME NUMBER							
5								
6	PARTITION NUMBER							
7								
8	Reserved (0)							
9	Reserved (0)							
10	ATTRIBUTE LIST LENGTH							
11								
12								
13								
14	Reserved (0)							
15	CONTROL							

12 Byte Command

Byte	Bit							
	7	6	5	4	3	2	1	0
0	OPCODE (??h)							
1	Reserved (0)				ELEMENT TYPE CODE			
2	ELEMENT ADDRESS							
3								
4	VOLUME NUMBER							
5	PARTITION NUMBER							
6	Reserved (0)							
7	Reserved (0)							
8	ATTRIBUTE LIST LENGTH							
9								
10								
11	CONTROL							

The ELEMENT TYPE CODE field specifies the type of the element containing the Auxiliary Memory being addressed. The Element Type Code values are identical to those used in the SCSI Media Changer command set..

The ELEMENT ADDRESS is the address of the element containing the Auxiliary Memory

The VOLUME NUMBER specifies a volume within the Media/Auxiliary Memory. This may be used to access multi-sided media

The PARTITION NUMBER specifies a partition within a volume. This may be used to access multi-partition media.

If the combination of ELEMENT TYPE CODE, ELEMENT ADDRESS, VOLUME NUMBER and PARTITION NUMBER is not valid within the Device Server then the command will terminate with CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST, and the additional sense code shall be set to INVALID ELEMENT ADDRESS.

The Device Server shall terminate the WRITE ATTRIBUTE command with CHECK CONDITION status, set the sense key to ILLEGAL REQUEST, set the additional sense code to INVALID FIELD IN ATTRIBUTE LIST, and shall not change any attributes parameters for the following conditions:

- If the Application Client sets any attribute that is not changeable by the Device Server to a value other than its current value;
- If the Application Client incorrectly sets the length of a attribute;
- If the Application Client sets any attribute to an unsupported value;

If there is not enough space to write the attributes to the Auxiliary Memory, the Device Server shall terminate the WRITE ATTRIBUTE command with CHECK CONDITION status, set the sense key to ILLEGAL REQUEST, set the additional sense code to INSUFFICIENT RESOURCES, and shall not change any attributes parameters.

If the Auxiliary Memory is not accessible then the Device Server shall terminate the WRITE ATTRIBUTE command with CHECK CONDITION status, set the sense key to MEDIUM ERROR, set the additional

sense code to AUXILARY MEMORY NOT ACCESSIBLE, and shall not change any attributes parameters.
(EDITORS NOTE: Note new ASC/ASQ ??)

The ATTRIBUTE LIST LENGTH field specifies the length in bytes of the attribute parameter list that shall be contained in the Data-Out Buffer. An ATTRIBUTE LIST LENGTH of zero indicates that the Data-Out Buffer shall be empty. This condition shall not be considered as an error.

The Device Server shall terminate the command with CHECK CONDITION status if the attribute list length results in the truncation of any Attribute. The sense key shall be set to ILLEGAL REQUEST, and the additional sense code shall be set to ATTRIBUTE LIST LENGTH
ERROR.

The Attribute parameters for the READ and WRITE ATTRIBUTE commands are defined in 8.X. If attribute parameters are defined in a device-type dependant manner, they will be documented in the applicable command standards (see 3.1.11).

7.XX READ ATTRIBUTE command

16 Byte CDB

Byte	Bit							
	7	6	5	4	3	2	1	0
0	OPCODE (8Bh)							
1	DISCOVERY KEY				ELEMENT TYPE CODE			
2	ELEMENT ADDRESS							
3								
4	VOLUME NUMBER							
5								
6	PARTITION NUMBER							
7								
8	FIRST ATTRIBUTE ID							
9								
10	ALLOCATION LENGTH							
11								
12								
13								
14	Reserved (0)							
15	CONTROL							

12 Byte CDB

Byte	Bit							
	7	6	5	4	3	2	1	0
0	OPCODE (??h)							
1	DISCOVERY KEY				ELEMENT TYPE CODE			
2	ELEMENT ADDRESS							
3								
4	VOLUME NUMBER							
5	PARTITION NUMBER							
6	FIRST ATTRIBUTE ID							
7								
8	ALLOCATION LENGTH							
9								
10								
11	CONTROL							

The ELEMENT TYPE CODE field specifies the type of the element containing the Auxiliary Memory being addressed. The Element Type Code values are identical to those used in SMC:

The ELEMENT ADDRESS is the address of the element containing the Auxiliary Memory

The VOLUME NUMBER specifies a volume within the Media/Auxiliary Memory. This may be used to access multi-sided media

The PARTITION NUMBER specifies a partition within a volume. This may be used to access multi-partition media.

If the combination of ELEMENT TYPE CODE, ELEMENT ADDRESS, VOLUME NUMBER and PARTITION NUMBER is not valid within the Device Server then the command will terminate with CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST, and the additional sense code shall be set to INVALID ELEMENT ADDRESS.

The FIRST ATTRIBUTE ID specifies the identifier of the first attribute to be retrieved. If this identifier does not exist then the command will terminate with CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST, and the additional sense code shall be set to INVALID FIELD IN CDB.

The ALLOCATION LENGTH field in the CDB indicates how much space has been reserved for the returned attribute list. If the length is not sufficient to contain the entire attribute list, complete attributes will be returned until the available space has been filled. This shall not be considered an error.

The DISCOVERY KEY field allows the Application Client to determine the configuration of the Auxiliary Memory components available at the Device Server. The possible values of this key are as follows:

Value   Meaning
0   Return Attribute Parameters
1   Return list of Element Type Codes available on the Device Server
2   Return list of Element Addresses available for an Element type
3   Return list of Volume Numbers available for an Element Address
4   Return list of Partition Numbers for a Volume Number

By setting each of these values in turn in conjunction with the addressing fields (ELEMENT TYPE CODE, ELEMENT ADDRESS, VOLUME NUMBER and PARTITION NUMBER) the Application Client may 'walk' the hierarchical tree of available data using a series of Read Attribute commands.

When a DISCOVERY KEY value is set, the Device Server will examine the other fields in the CDB to determine the type of data being requested, according to the following table:

Discovery Key	Address Fields				Data Reported
	ELEMENT TYPE CODE	ELEMENT ADDRESS	VOLUME NUMBER	PARTITION NUMBER	
1	X	X	X	X	Element Type info
2	as specified	X	X	X	Element Address info
3	as specified	as specified	X	X	Volume Number info
4	as specified	as specified	as specified	X	Partition Number info
0	as specified	as specified	as specified	as specified	Attribute Sets

When a DISCOVERY KEY value is set, the returned data format from the Device Server will be unique to the type of data being requested. In these cases, the 'Log page' model shown in the Data Format section of this proposal will not be used. The returned data formats for these special situations are:

Discovery Key = 1 : Report the Element Type Codes available on the Device Server:

	7	6	5	4	3	2	1	0
0	REPORT LENGTH (N-1)							
1								
2	Reserved (0)				Element Type Code 1			
..	..							
N	Reserved (0)				Element Type Code N			

One byte of information is returned for each Element Type Code available on the Device Server.

The REPORT LENGTH field specifies the length in bytes of the following data. It does not include itself. The remaining bytes in the report are each of the ELEMENT TYPE CODE values the Device Server supports.

Discovery Key = 2 : Report the number of Element Addresses available for the specified Element Type Code:

	7	6	5	4	3	2	1	0
0	FIRST ELEMENT ADDRESS							
1								
2	NUMBER OF ELEMENTS AVAILABLE							
3								

The FIRST ELEMENT ADDRESS field is the address of the first element available of the specified Element Type Code.
The NUMBER OF ELEMENTS AVAILABLE specifies the number of elements available of the specified Element Type Code.

The Element Addresses must be contiguous. If the Device Server also supports the SMC command set, then the Element Addresses must be consistent with it.

Discovery Key = 3 : Report the number of Volumes available at the specified Element Address:

	7	6	5	4	3	2	1	0
0	FIRST VOLUME NUMBER							
1								
2	NUMBER OF VOLUMES AVAILABLE							
3								

The FIRST VOLUME NUMBER specifies the first Volume at the specified Element Address. It is recommended that Volume numbering start at 0.
The NUMBER OF ELEMENTS AVAILABLE indicates the number of Volumes available at the specified Element Address.

Discovery Key = 4: Report the number of Partitions available on the specified Volume Number:

	7	6	5	4	3	2	1	0
0	FIRST PARTITION NUMBER							
1								
2	NUMBER OF PARTITIONS AVAILABLE							
3								

The FIRST PARTITION NUMBER is the first Partition available on the specified Volume Number. It is recommended that Volume numbering start at 0.

The NUMBER OF ELEMENTS AVAILABLE indicates the number of Partitions available on the specified Volume Number.

If the Auxiliary Memory is not accessible then the Device Server shall terminate the WRITE ATTRIBUTE command with CHECK CONDITION status, set the sense key to MEDIUM ERROR, set the additional sense code to AUXILARY MEMORY NOT ACCESSIBLE, and shall not change any attributes parameters.
(EDITORS NOTE: Note new ASC/ASQ ??)

8.X Attribute Data

This clause describes the format of the data sent with a Write Attribute command, or returned in response to a Read Attribute command. Using these commands AM Attributes will be returned as a sequence in numerical order keyed from the ATTRIBUTE ID. Each Attribute will be individually formatted using the format shown below.

Reserved, unused or undefined Attributes, and Host Vendor Unique Attributes that have been cleared are not to be returned.

This is a logical representation only and implies nothing about the physical representation of the data in the Auxiliary Memory.

	7	6	5	4	3	2	1	0
0	ATTRIBUTE ID							
1								
2	RESERVED (0)						READ ONLY	BINARY
3	ATTRIBUTE LENGTH (n-4)							
4								
5 .. n	ATTRIBUTE VALUE							

ATTRIBUTE ID is the binary identifier for a single Attribute. The meaning of the Attribute ID shall be according to the Attribute Set defined in this standard for the Device Type being addressed.

The READ ONLY bit specifies whether an Attribute is read-only or not.

The BINARY bit specifies whether the field contains ASCII or Binary data. If zero the Attribute consists of ASCII characters, if one the Attribute consists of binary data.

ATTRIBUTE LENGTH is the length (in bytes) of the Attribute that follows it. If a Write Attribute command is sent with an Attribute Length of zero, then the Device Server shall disregard the value in the Attribute Value field. The Attribute will thus be cleared in the following way, provided that the Attribute is actually writeable:
- Host Vendor Unique Attributes will be cleared so that they no effectively no longer exist, i.e. they will not be returned in response to a Read Attribute command.
- All other Attributes will be reset to default values; all zeros in the case of binary Attributes; all space characters in the case of ASCII Attributes.

Example
The Application Name attribute (Attribute ID 1403h) might be returned as:

```
Byte 0:  14h                    }
Byte 1:  01h                    } Attribute ID =1403h
Byte 2:  00h                    Descriptor ('control byte')
Byte 3:  00h                    }
Byte 4:  20h                    } Attribute Length = 32
Bytes 5-36:      "ACME Backup "      Attribute Value (padded with trailing spaces)
```

8.X.1 Media Auxiliary Memory Attribute Data

The following set of attribute parameters has been defined for Media Auxiliary Memory.

The Attributes are split up into *sections* according to the source of changes or updates. The attribute sections are:

Attribute Ids	Maximum Number of Attributes	Section
0000h – 03FFh	1024	Device Section
0400h – 07FFh	1024	Media Section
0800h – 0BFFh	1024	Host Section
0C00h – 0FFFh	1024	Device Vendor Unique Section
1000h – 13FFh	1024	Media Vendor Unique Section
1400h – 17FFh	1024	Host Vendor Unique Section
1800h - FFFFh		Reserved

All ASCII strings are padded with trailing spaces where necessary.

8.X.1.1 Device Section

The Device Server should maintain this section.

All the attributes are read-only (READ ONLY = 1).

ID	Attribute Name	#Bytes	Format
0000h	MAIN PARTITION REMAINING CAPACITY	4	Binary
0001h	MAIN PARTITION MAXIMUM CAPACITY	4	Binary
0002h	TAPEALERT FLAGS	8	Binary
0003h	LOAD COUNT	4	Binary
0004h	SPACE REMAINING	4	Binary
0005h	INITIALISED FORMAT	2	Binary
0006h	INITIALISATION COUNT	2	Binary
0007h – 020Ah	RESERVED		
020Ah	DEVICE MAKE/SERIAL NUMBER AT LAST LOAD	40	ASCII
020Bh	DEVICE MAKE/SERIAL NUMBER AT LOAD –1	40	ASCII
020Ch	DEVICE MAKE/SERIAL NUMBER AT LOAD –2	40	ASCII
020Dh	DEVICE MAKE/SERIAL NUMBER AT LOAD –3	40	ASCII
020Eh – 021Fh	RESERVED		
0220h	TOTAL MBYTES WRITTEN IN MEDIA LIFE	8	Binary
0221h	TOTAL MBYTES READ IN MEDIA LIFE	8	Binary
0222h	TOTAL MBYTES WRITTEN IN CURRENT/LAST LOAD	8	Binary
0223h	TOTAL MBYTES READ IN CURRENT/LAST LOAD	8	Binary

ID	Attribute Name	#Bytes	Format
0224h – 033Fh	Reserved		
0340h	LOAD/UNLOAD AT PARTITION	1	Binary
0341h	MEDIA USAGE HISTORY	76	Binary
0342h	PARTITION USAGE HISTORY	72	Binary
0343h – 03FFh	Reserved		

The MAIN PARTITION REMAINING CAPACITY and MAIN PARTITION MAXIMUM CAPACITY attributes are native capacities in Mbytes, assuming no data compression

The TAPEALERT FLAGS attribute provides a means of reporting the state of the TapeAlert flags for the previous load of the media. Each TapeAlert flag occupies one bit (Flag 1 = MSB, Byte 1, Flag 64 = LSB, Byte 8). The bits indicate all the TapeAlert flags that were set during the previous load, i.e. the bits are 'sticky' for the load.

The LOAD COUNT attribute specifies how many times this piece of media has been loaded.

The SPACE REMAINING specifies the space currently free in the MAM. The total MAM capacity is reported in the Media section. Note that it may not always be possible to utilize all of the free space in a given MAM implementation. Depending on the internal organization of the memory and the software that controls it, fragmentation issues may mean that certain attribute sizes might not be fully accommodated as the MAM nears its maximum capacity.

If the Device Server formats the media into a format other than the one indicated in the MEDIA TYPE attribute in the Media Section (e.g. for compatibility with a previous generation format), then the INITIALISED FORMAT indicates the SCSI Density Code of the format chosen. Otherwise this attribute will be the same as MEDIA TYPE.

The INITIALISATION COUNT attribute indicates the number of times that a Device Server has logically formatted the medium. This figure is cumulative over the life of the media and shall never be reset.

The DEVICE MAKE/SERIAL NUMBER AT LAST LOAD, DEVICE MAKE/SERIAL NUMBER AT LOAD –1, DEVICE MAKE/SERIAL NUMBER AT LOAD –2 and DEVICE MAKE/SERIAL NUMBER AT LOAD –3 attributes give a rolling history of the last four Device Servers in which the media has been loaded. This allows library controllers or application software to correlate media condition with media load history in order to identify Device Servers that may be causing media problems. The first 8 bytes are the Device Manufacturer ID, and the last 32 bytes are the Device Serial Number. Both attributes should be padded with trailing spaces where necessary.

The TOTAL MBYTES WRITTEN IN MEDIA LIFE and TOTAL MBYTES READ IN MEDIA LIFE attributes specify the total number of Mbytes of data that are transferred to or from the media over the entire media life. These figures are cumulative and must never be reset.

Note that the amount of data must be measured from the device/media interface's point of view, not the Application Client's. For example, if new media is loaded into a Device Server then the Application Client writes 100MBytes, rewinds and then writes 100MBytes again, then the Total MBytes Written in Media Life will be 200MBytes. This figure must not incorporate data compression, i.e. it must represent the amount of data actually written to the media surface.

The TOTAL MBYTES WRITTEN IN CURRENT/LAST LOAD and TOTAL MBYTES READ IN CURRENT/LAST LOAD are similar to the attributes above for the current load (if the media is currently

loaded) or the last load (if the media is currently unloaded). The Device Server should reset these attributes to zero as soon as a media is loaded.

The LOAD/UNLOAD AT PARTITION ATTRIBUTE indicates whether loads/unloads are enabled for the Partition specified in the command.

The MEDIA USAGE HISTORY INFORMATION attribute provides statistical counters for the entire media. The value in each field is the sum of all partitions. If a field is no used it should be set to zero.

0-3	Current Number of Clusters Written
4-7	Current Write Retry Count
8-11	Current Number of Clusters Read
12-15	Current ECC Retries Count
16-19	Previous Number of Clusters Written
20-23	Previous Write Retries Count
24-27	Previous Number of Clusters Read
28-31	Previous ECC Retries Count
32-35	Total Number of Clusters Written
36-39	Total Write Retries Count
40-43	Total Number of Clusters Read
44-47	Total ECC Retries Count
48-51	Load Count
52-55	Change Partition Count
56-59	Partition Initialize Count

The exact definition of the counters is not part of this standard. These counters should not be used to compare products because the products may define errors differently.

The PARTITION USAGE HISTORY attribute provides statistical counters for the partition specified in the CDB. If a field is no used it should be set to zero.

0-3	Current Number of Clusters Written
4-7	Current Write Retry Count
8-11	Current Number of Clusters Read
12-15	Current ECC Retries Count
16-19	Previous Number of Clusters Written
20-23	Previous Write Retries Count
24-27	Previous Number of Clusters Read
28-31	Previous ECC Retries Count
32-35	Total Number of Clusters Written
36-39	Total Write Retries Count
40-43	Total Number of Clusters Read
44-47	Total ECC Retries Count
48-51	Load Count
52-55	Change Partition Count
56-59	Partition Initialize Count
64-67	Last Valid Absolute Frame Number
68-71	Partition Attribute
72-75	Maximum Absolute Frame Number

The exact definition of the counters is not part of this standard. These counters should not be used to compare products because the products may define errors differently.

8.X.1.2 Media Section

These attributes are hard coded into the MAM at media manufacture time.

All the attributes are read-only (READ ONLY = 1) .

ID	Attribute Name	#Bytes	Format
0400h	MEDIA MANUFACTURER	8	ASCII
0401h	MEDIA SERIAL NUMBER	32	ASCII
0402h	MEDIA LENGTH	2	Binary
0403h	MEDIA TYPE	2	Binary
0404h	MEDIA MANUFACTURE DATE	8	ASCII
0405h	MAM CAPACITY	4	Binary
0406h	SPECIAL MEDIA IDENTIFIER	1	Binary
0407h	SPECIAL MEDIA INFORMATION #1	2	Binary
0408h	SPECIAL MEDIA INFORMATION #2	2	Binary
0409h	AUXILARY MEMORY REVISION	2	Binary
040Ah – 07FFh	Reserved		

The MEDIA MANUFACTURER identifies the manufacturer of the media. (see Annex D)

The MEDIA SERIAL NUMBER identifies the manufacturer's serial number for the media.
The MEDIA LENGTH attribute indicates the length of the media in metres.

The MEDIA TYPE is the same numeric Density Code as reported in the SCSI Mode Block Descriptor and Report Density Support command and allows the media type to be detected. A value of zero will be returned for a cleaning media.

The MEDIA MANUFACTURE DATE specifies the date of manufacture of the media. The format is YYYYMMDD.

The MAM CAPACITY is the total capacity of the MAM, in bytes, at manufacture time. It does not indicate the free space of a 'blank' MAM as some of the MAM space may be reserved for device-specific use that is inaccessible to the Application Client.

The SPECIAL MEDIA IDENTIFIER and SPECIAL MEDIA INFORMATION attributes give information about non-data media and other special types of media. The SPECIAL MEDIA INFORMATION attributes must be interpreted according to type of media indicated by the Special Media Identifier. Defined values are:

Special Media Identifier	Meaning	Interpretation of Special Media Information #1	Interpretation of Special Media Information #2
00h	Data media	Reserved	Reserved
01h	Cleaning media	Maximum number of cleaning cycles permitted	Number of cleans
02h-7Fh	Reserved	Reserved	Reserved
80h	Write-once media	Reserved	Reserved
81h-FFh	Reserved	Reserved	Reserved

The format of the AUXILARY MEMORY REVISION is not specified in this standard.

8.X.1.3 Host Section

The Host section is the primary means of allowing separation or portability of media between different software applications and platforms.

The Application Client using the Read Attribute command should maintain this section

All the attributes are read/write (READ ONLY = 0).

ID	Attribute Name	#Bytes	Format
0800h	APPLICATION VENDOR	8	ASCII
0801h	APPLICATION NAME	32	ASCII
0802h	APPLICATION VERSION	8	ASCII
0803h	APPLICATION TEXT LABEL	150	ASCII
0804h	DATE & TIME LAST WRITTEN	12	ASCII
0805h	TEXT LOCALISATION IDENTIFIER	2	Binary
0806h	BARCODE	32	ASCII
0807h	SERVER NAME	50	ASCII
0808h	MEDIA POOL	50	ASCII
0809h	VOLUME APPLICATION TEXT LABEL SIZE	2	Binary
080Ah	VOLUME APPLICATION TEXT LABEL	N/A	Binary
080Bh	PARTITION APPLICATION TEXT LABEL MAP	32	Binary
080Ch	PARTITION APPLICATION TEXT LABEL SIZE	2	
080Dh	PARTITION APPLICATION TEXT LABEL	N/A	ASCII
080Eh – BFFh	Reserved		

All of the following strings are padded with trailing spaces where necessary.

The APPLICATION VENDOR identifies the manufacturer of the Application Client (e.g. backup program) (see Annex D)

The APPLICATION NAME identifies the name of the Application Client.

The APPLICATION VERSION identifies the version of the Application Client.

The APPLICATION MEDIA TEXT LABEL is the user level identifier for the media. It is a null terminated string. Note that this attribute is fixed at 150 bytes in size, so 150 byte should always be sent.

The DATE & TIME LAST WRITTEN specifies when the Application Client last wrote to the media. The format for the string is YYYYMMDDHHMM.

The TEXT LOCALISATION IDENTIFIER defines the format of the text held in the textual attributes in the Host Section. The two bytes are:

MS Byte	LS Byte
Country Code	Minor Code

00h = no code specified	00h = no code specified
81h = Japan	01h = JIS (old) code
other codes are yet to be defined	02h = JIS (new) code
	03h = Shift JIS code
	04h = EUC code
	05h = IBM EBCDIC
	06h = Unicode
	07h - FFh are Reserved

If 0000h is returned for this attribute then the Application Client can assume that the encoding of all text attributes is plain ASCII.

The BARCODE attribute allows an Application Server to store the contents of a Barcode associated with the media in the MAM.

The SERVER NAME attribute indicates the server from which that APPLICATION MEDIA TEXT LABEL originates.

The MEDIA POOL attribute indicates the MEDIA POOL to which this piece of media belongs.

The VOLUME APPLICATION TEXT LABEL SIZE specifies the size of the VOLUME APPLICATION TEXT LABEL

The VOLUME APPLICATION TEXT LABEL is a variable length attribute that is the application text label of the volume. Note that this is equivalent to the APPLICATION TEXT LABEL, either form can be used.

The PARTITION APPLICATION TEXT LABEL MAP is an array of 256 bits where each bit represents a partition number. Bit zero represents partition zero and bit 255 represents partition 255. A bit value of one indicates that a Partition Application Text Label exists.

The PARTITION APPLICATION TEXT LABEL SIZE specifies the size of the PARTITION APPLICATION TEXT LABEL for the partition specified Partition Number field of the CDB.

The PARTITION APPLICATION TEXT LABEL is a variable length attribute that is the application text label of the partition.

8.X.1.4 Device Vendor Unique Section

These attributes allow vendor unique information to be stored by the Device Server.

ID	Attribute Name	#Bytes	Format
0C00h – 0FFFh	Unique to device vendor		

8.X.1.5 Media Vendor Unique Section

This section exposes as attributes any data hard-coded in the MAM at manufacture time that Application Clients may need access to. Such access must be provided by arrangement with specific device vendors.

ID	Attribute Name	#Bytes	Format
1000h – 13FFh	Unique to media vendor		

8.X.1.6 Host Vendor Unique Section

These attributes are intended to allow software applications to read and write their own Attributes.

They are written using the Write Attribute command, and may removed/destroyed using the Write Attribute command with an Attribute Length of zero.

The main restriction on their use will be MAM capacity remaining after the Media, Device, Host and Device Vendor Unique usage. This can be determined using the MAM Space Remaining attribute in the Device section.

ID	Attribute Name	#Bytes	Format
1400h – 17FFh	Unique to software vendor		