TO: T10 Membership, ADI Working Group
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SUBJECT: ADI State Transition Table (document T10/02-257r1)

Introduction

This document is a follow-up to T10/02-097r1 that describes various proposed drive polling frames. One action item that resulted from discussions of that document was a request for a state diagram example showing the values of the fields in the Very High Frequency polling frame. The purpose of this document is to present such an example.

The example shown in this document is not intended to reflect any particular tape drive type, but be generic enough to demonstrate the use of all the fields that any drive may use. As a result, discussion and debate on the listed sequence and associated states is anticipated.

Changes from T10/02-257r0

The tables have been updated to show the state transitions without the *Motion Status* or *MAM Accessible* fields. Motion Status was removed to avoid dependency on it for determining state, and MAM Accessible was removed since it is optional. *Load Complete* has been renamed *Data Accessible* to be consistent with being a state.

The states have been re-worked to resolve potential redundancy among *Access Allowed*, *Unload Complete*, and *Media Ejected*. This resulted in the replacement of both Access Allowed and Media Ejected with *Robotic Access Allowed*. *Unload Complete* was also replaced with *Hold Point*.

If accepted, these changes will also need to be reflected in the Very High Frequency polling frame definition as incorporated in ADC.

A blank state transition table has been included to facilitate alternate examples. Some state descriptions have been updated.

During discussion of the previous revision of this document, a suggestion was made to create some sort of “state transition capabilities” mode or vital product data page that would allow a drive to indicate which states and state transitions it supported. This suggested is noted here to illicit further discussion.

Ordered Sequence View

This section presents a complete Load and Unload sequence, starting from a powered up state. Many states in the sequence do not change while a transition or series of transitions are taking place.

Load Event/State Sequence List	Robotic Access Allowed	Media Present	Hold Point	Media Seated	Media Threaded	Data Accessible
01) Drive initialized, no media present, no activity.	1	0	0	0	0	0
02) Initial media placement into drive	1	1*	0	0	0	0
03) After media "push" by automation	0	1	0*	0	0	0
04) Initial mechanical load by drive	0	1	0*	0	0	0
05) After initial mechanical drive load	0	1	1*	0	0	0
06) Final mechanical load by drive (seating)	0	1	0	0	0	0
07) After final mechanical drive load (seated)	0	1	0	1	0	0
08) Media threading	0	1	0	1	0	0
09) Media threaded	0	1	0	1	1	0
10) Load complete (drive ready)	0	1	0	1	1	1
11) *<Various drive usage activity (reads, writes)>*	0	1	0	1	1	1
12) Drive receives unload command, starts rewind and unthread	0	1	0	1	1	0
13) Media unthreaded	0	1	0	1	0	0
14) Initial mechanical unload by drive (unseating)	0	1	0	0	0	0
15) After initial mechanical drive unload (unseated)	0	1	0	0	0	0
16) Secondary mechanical unload by drive (to hold point)	0	1	0	0	0	0
17) Drive unloaded to hold point	0	1	1	0	0	0
18) Request to eject from automation, final mechanical drive unload	0	1	0	0	0	0
19) Media in ejected position	1	1*	0	0	0	0
20) Media retrieved from drive by automation, drive empty	1	0	0	0	0	0
21) *<Repeats from 02>*						

** - Could be 0 or 1 depending on drive capability. Value shown is preferred value.*

Discussion items: Suitable name for *Hold Point*, possible need for "State in Transition" bit.

Unique States View

This section presents the same states from the sequence in the previous section, but lists them according to the state values to compare or uniqueness.

Load Event/State Sequence List	Robotic Access Allowed	Media Present	Hold Point	Media Seated	Media Threaded	Data Accessible	Signature
03) After media "push" by automation	0	1	0*	0	0	0	10h
04) Initial mechanical load by drive	0	1	0*	0	0	0	10h
06) Final mechanical load by drive (seating)	0	1	0	0	0	0	10h
14) Initial mechanical unload by drive (unseating)	0	1	0	0	0	0	10h
15) After initial mechanical drive unload (unseated)	0	1	0	0	0	0	10h
16) Secondary mechanical unload by drive (to hold point)	0	1	0	0	0	0	10h
18) Request to eject from automation, final mechanical drive unload	0	1	0	0	0	0	10h
07) After final mechanical drive load (seated)	0	1	0	1	0	0	14h
08) Media threading	0	1	0	1	0	0	14h
13) Media unthreaded	0	1	0	1	0	0	14h
09) Media threaded	0	1	0	1	1	0	16h
12) Drive receives unload command, starts rewind and unthread	0	1	0	1	1	0	16h
10) Load complete (drive ready)	0	1	0	1	1	1	17h
11) *<Various drive usage activity (reads, writes)>*	0	1	0	1	1	1	17h
05) After initial mechanical drive load	0	1	1*	0	0	0	18h
17) Drive unloaded to hold point	0	1	1	0	0	0	18h
01) Drive initialized, no media present, no activity.	1	0	0	0	0	0	20h
20) Media retrieved from drive by automation, drive empty	1	0	0	0	0	0	20h
02) Initial media placement into drive	1	1*	0	0	0	0	30h
19) Media in ejected position	1	1*	0	0	0	0	30h

As can be seen in this view of the various states, many sequence items have the same state "signature". This is a result of representing the same achieved state on both a Load and an Unload, or not changing state while in transition between states. Depending on whether or not the drive supports the same discrete states as shown in this example, this may or may not occur. Other states may also have the same signature depending on the drive's capabilities to detect certain conditions such as Media Present. Again, in these cases all the states shown may not occur, which would effectively condense the sequence for that particular drive.

Basically, the states themselves do not indicate what the drive is "doing" but rather simply what state or position the media is in relative to the drive. Transitions between states are not discernable either from the states themselves.

Blank State Transition Table

Load Event/State Sequence List	MTE Accessible	Media Present	Hold Point	Media Seated	Media Threaded	Data Accessible
01)						
02)						
03)						
04)						
05)						
06)						
07)						
08)						
09)						
10)						
11)						
12)						
13)						
14)						
15)						
16)						
17)						
18)						
19)						
20)						
21)						