TO: T10 Membership, ADI Working Group
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SUBJECT: ADI ADC State Transition Table (document T10/03-042r1)

Revision 1
Updated per discussion at Portland meeting, modified to be normative rather than informative, expand examples.

Revision 0
Proposal was informative example only.

Introduction

This document is a follow-up to T10/02-257r1 that presents a state diagram example showing the values of the fields in the Very High Frequency polling frame. Discussion of that document resulted in an action item to show the *In Transition* field in the table, as well as develop narrative text to present the information suitable for inclusion in ADC. This proposal addresses that action item by creating both normative and informative tables and corresponding text.

The proposed text would be placed in the *Automation drive interface overview* section (4.2.1) of the current ADC draft (revision 1).

Proposed changes to ADC

4.2.1.1 Load and unload normative states

Table 1 defines the valid states that can be reported in the Very High Frequency data during load operations. Automation devices rely on this information to coordinate handling of the media into the DTE, as well as to provide activity status back to users of the system.

Table 1 – Load sequence normative states

Load Sequence State	InXtn	RAA	MPrsnt	HPnt	MStd	MThrd	DAcc
a) DTE initialized, no media present	0	1	0	0	0	0	0
b) Initial media placement into DTE	0	1	(0 or 1)	0	0	0	0
c) After secondary media placement in DTE	0	0	1	(0 or 1)	0	0	0
d) Mechanical loading by DTE	1	0	1	(0 or 1)	0	0	0
e) Media threading	1	0	1	0	1	0	0
f) Preparing for data access	1	0	1	0	1	1	0
g) Load complete (DTE ready)	0	0	1	0	1	1	1

Load states (a) and (g) shall be supported by the ADC device server at a minimum. To indicate an error in any of the states, the recovery requested (RRqst) field in the Very High Frequency data shall also be set to 1.

Load state (a) represents an empty DTE, available for loading by the automation device.

Load state (b) represents initial placement of media into the DTE by automation. Depending on the DTE's design, media present may also be detected and reported coincident with this state.

Load state (c) represents detection and acknowledgement by the DTE of media presence, and optionally hold point. This state may be reflected after a media "push" by the automation for example. Depending on the DTE's design, hold point may also be reported coincident with this state. This state may be reported with and without hold point during the same load sequence. For example, if the DTE utilizes the "push" by automation as stimulus to state (d) to reach hold point, state (c) would first be reported without hold point, followed by state (d) (also without hold point), and finally state (c) again, but now with hold point. In this example the DTE would then be waiting for another stimulus to continue the load operation.

Load state (d) represents media loading (handling) under the control of the DTE. It may be used to reach hold point as well as to seat the media.

Load state (e) represents the media threading operation that takes place after the media is seated.

Load state (f) represents any additional processing that may be done by the DTE after threading the media, but prior to the load being fully complete to allow data access.

An example showing use of the states is given in table 2.

Table 2 – Load sequence example

Load Sequence Event	InXtn	RAA	MPrsnt	HPnt	MStd	MThrd	DAcc
1) DTE initialized, no media present	0	1	0	0	0	0	0
2) Initial media placement into DTE	0	1	0	0	0	0	0
3) After “push” by automation	0	0	1	0	0	0	0
4) Mechanical loading by DTE to hold point	1	0	1	0	0	0	0
5) After loading by DTE to hold point	0	0	1	1	0	0	0
6) After “load” command from automation	1	0	1	0	0	0	0
7) After seating, media now threading	1	0	1	0	1	0	0
8) Media threaded, preparing for data access	1	0	1	0	1	1	0
9) Load complete (DTE ready)	0	0	1	0	1	1	1

The load sequence begins with the drive initialized, no media present and robotic access allowed (1). The automation device then places media into the drive, which is not yet recognized by the drive (2). After the initial placement, the automation device pushes the media into the drive, such that media presence is now detected (3). The drive uses the detection of media presence as stimulus to mechanically load the media to hold point (4, 5). After reaching hold point, the automation then issues a “load” command to the drive that causes it to mechanically seat the media (6) and then continues by threading the media (7). After threading, the drive has some final firmware preparations to make (8) prior to completing the load (9). Depending on the drive technology and design, one or more of the steps may be combined or eliminated.

Table 3 defines the valid states that can be reported in the Very High Frequency data during unload operations. Automation devices rely on this information to coordinate handling of the media from the DTE, as well as to provide activity status back to users of the system.

Table 3 – Unload sequence normative states

Unload Sequence Event	InXtn	RAA	MPrsnt	HPnt	MStd	MThrd	DAcc
a) DTE rewinding	1	0	1	0	1	1	0
b) Media unthreaded, still unloading	1	0	1	0	1	0	0
c) Media unseated, still unloading	1	0	1	0	0	0	0
d) DTE unloaded to hold point	0	0	1	1	0	0	0
e) Media ejecting	1	0	1	1	0	0	0
f) Media in ejected position	0	1	(0 or 1)	0	0	0	0

Unload state (a) reflects the initial DTE state after receiving a request to unload.

Unload state (b) reflects the DTE state during the unload operation after the media has been unthreaded.

Unload state (c) reflects the DTE state during the unload operation after the media has been unseated.

Unload state (d) reflects the DTE state after unloading to hold point. An external stimulus, such as a request to eject or load, is needed to leave this state. If this state is not used, the DTE may transition directly from state (c) to state (f).

Unload state (e) reflects the DTE state while ejecting the media from the hold point.

Unload state (f) reflects the DTE state after the media is unloaded and ejected. Depending upon the DTE’s design, it may continue to report media present until the media is completely removed.

To indicate an error in any of the states, the recovery requested (RRqst) field in the Very High Frequency data shall also be set to 1.

As an example, an “unload to hold point” sequence would use states (a) through (d). An “unload to eject” sequence would use states (a) through (c), then states (e) and (f), with state (e) possibly being bypassed.