To: INCITS T10 Committee From: Susan Gray, Quantum

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Subject: ADT Link service error recovery

## 1 Revision History

Revision 0: Initial proposal

### 2 Discussion

The current error recovery section does not address error recovery of link service frames. The following table summarizes the intended recovery procedures for each frame type and port state. "Corrupted" errors become retryable errors and are not listed in the table. Symbol framing errors don't relate to frames and always have the same recovery procedure and therefore are not listed in the table.

**Legend**: retryable (sender detected error) protocol – should never happen

resource limitation recoverable (only possible for non-link service frames)

Frame	Port Login	Port Logout	NOP	Pause	Initiate Recovery	Other frame
State						types
P0 Initial	Initiate new login exchange – transition to P1	None	None	None	Illegal	Illegal
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	N/A	N/A	N/A	N/A	N/A	Nak w/ PR 0
P1 Login	Initiate new login exchange – transition to P1	None	None	None	Illegal	Illegal
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	N/A	N/A	N/A	N/A	N/A	Nak w/ PR 0
P2 Active	Initiate new login exchange – transition to P1	None	None	None	N/A	Resend – transition to T1
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	N/A	N/A	N/A	N/A	N/A	Nak w/ PR 1 Transition to R1
P3 Paused	Illegal	Illegal	Illegal	Illegal	Illegal	Illegal
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	N/A	N/A	N/A	N/A	N/A	Nak w/ PR 1 Transition to R1
P4 Logged	Illegal	Illegal	Illegal	Illegal	Illegal	Illegal
Out	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	N/A	N/A	N/A	N/A	N/A	Nak w/ PR 1
	2711		27.	27/	2711	Transition to R1
R1 Pending	N/A	N/A	N/A	N/A	N/A	N/A
Recovery	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0

	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	N/A	N/A	N/A	N/A	N/A	Nak w/ PR 1
R2	N/A	N/A	N/A	N/A	N/A	N/A
Recovering	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0	Nak w/ PR 0
	N/A	N/A	N/A	N/A	N/A	Nak w/ PR 1
T1 Initiate	Intiate new login	None	None	None	-Resend	N/A
Recovery	exchange –					
	transition to P1					
	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A
T2 Retry	Intiate new login	None	None	None	-Abort open	N/A
Initiate	exchange –				exchanges	
Recovery	transition to P1				-initiate Login	
					exchange with	
					default params (AOE	
					= 1)	
	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A

ADT Revision 10 currently includes the following error recovery subclauses:

## 4.7 link layer error recovery

- 4.7.1 Error detection
- 4.7.1.1 Error detection overview
- 4.7.1.2 Error detection by the frame sender
- 4.7.1.3 Error detection by the frame receiver
- 4.7.2 Error recovery for non link service frames
- 4.7.2.1 (place holder for Port Login recovery)
- 4.7.2.2 Retryable error
- 4.7.2.3 Corrupted frame
- 4.7.2.4 Protocol error
- 4.7.2.5 Resource limitation
- 4.7.2.6 Recoverable error
- 4.7.2.7 Error recovery for symbol framing errors

# 3 Proposed changes

### 4.7.2 Error recovery for non link service frames

#### 4.7.2.1 Error recovery for Login IUs

If a transmission retryable error is detected on in a Port Login IU, the recovery process procedure is to restart the negotiation process. This is accomplished by transitioning to P1:Login and initiating a login. Port Login IU with a frame number of zero and a new exchange ID value. Values in the payload of the frame shall should be set to the default values for the port.

If an error is detected in a Port Login IU, or if a Port Login exchange is initiated as part of the recovery process for error on other frames, the port's operating parameters shall be set to the default values. See clause 4.2 for the default operating parameters.

## 4.7.2.7 Error recovery for symbol framing errors

After detecting four or more symbol framing errors without the receipt of a frame, a port shall abort all exchanges, set the operating parameters of the interface to default settings, transition to P1:Login and initiate a Port Login exchange with the AOE bit set to one.