

Draft Minutes
Automation/Drive Interface (ADI) Working Group
Ad Hoc Meeting
T10/04-080r0
8-9 March 2004
9:00 AM – 7:00 PM (8 March)
9:00 AM – 11:00 AM (9 March)

1. Introductions: Group

Paul Suhler called the meeting to order at 9:05 AM PDT on 8 March 2004. He thanked QLogic for hosting the meeting. A table of the attendees appears at the end of these minutes.

2. Approval of the agenda: 04-081r0 Paul Suhler

Paul Suhler discussed the order of the discussion items. He added one item under unscheduled business, Timeout After Baud Rate Change. (Several other requests for Unscheduled Business arose during the meeting after approval of the agenda.)

Michael Banther made a motion for acceptance of the modified agenda. Rod Wideman seconded the motion. In the absence of objections or abstentions, the group passed the motion unanimously.

3. Approval of previous meeting minutes: Paul Suhler

12-13 January 2004 meeting	04-034r0
26 January 2004 teleconference	04-051r0
9 February 2004 teleconference	04-057r0
23 February 2004 teleconference	04-066r0

Paul Suhler requested comments for the minutes of the 12-13 January 2004 meeting, the 26 January 2004 teleconference, the 9 February 2004 teleconference, and the 23 February 2004 teleconference – 04-034r0, 04-051r0, 04-057r0, and 04-066r0 respectively. No comments were forthcoming.

Rod Wideman made a motion for acceptance of the minutes as written. Susan Gray seconded the motion. In the absence of objections or abstentions, the group passed the motion unanimously.

4. Review of action items: Michael Banther

- a. Rod Wideman will send an e-mail to the T10 reflector that tags possibly controversial technical comments in 03-385r1. *Closed*
- b. Kevin Butt will generate a proposal to address the problem described in unscheduled business item (b) of 04-034r0. *Closed*, see Unscheduled Business item (d).
- c. Paul Entzel will generate a proposal to deal with recoverable transport layer errors with PR equal zero, e.g., out of resources (see discussion item [g] of 04-034r0). *Closed*

- d. Michael Banther will investigate and if necessary generate a proposal to state the behaviour of a port upon detection of a non-recoverable (retryable) error. *Closed*
- e. Susan Gray will revise 04-056r1 based on discussion item (a) of 04-066r0. *Closed*
- f. Susan Gray will incorporate the N0 to N2 transition from discussion item (b) into 04-056r2. *Closed*
- g. Paul Suhler will forward the Visio drawings for 04-053r0 to Paul Entzel. *Closed*
- h. Paul Entzel will incorporate 04-053r0 into ADT. *Carryover*
- i. Paul Suhler will revise 04-062r0 based on discussion item (e) 04-066r0. *Closed*
- j. Michael Banther will revise 04-067r0 based on discussion item (f) 04-066r0. *Closed*
- k. Paul Entzel will incorporate 04-067r0 as revised into ADT. *Carryover*
- l. Paul Suhler will revise 03-133r4 to include a smaller connector in ADT-2. *Closed*

5. Discussion items:

- a. ADT Error Recovery 04-056r2 Susan Gray

Susan Gray described the changes made in this revision. Paul Suhler questioned whether the state machine really issues the (almost) global Send Acknowledgement IU from every state except N5: Login Complete.

After some confusion we agreed that the proposed text in 4.7.2.1, Error recovery for Login IU's, needs some editorial changes. Paul Entzel and Michael Banther suggested some text. Susan Gray agreed to a change.

Michael Banther asked for clarification that the receipt of any malformed Port Login IU always causes a transition to N0: Idle. Paul Entzel pointed out that we have to be careful that readers cannot interpret the word 'error' to mean unacceptable parameter values. Susan Gray mentioned that we do not want a transition to N0: Idle on receipt of a corrupted frame either. Susan enumerated the types of errors possible and considered them one-by-one. Paul provided a look-ahead to his Resource Limitation proposal and the error recovery for Port Login IU's. Susan concluded that only protocol errors and resource limitation errors shall cause a transition to N0: Idle.

Michael Banther suggested altering 4.7.2.1 to cover all of the possible error types rather than just the protocol and resource limitation errors. Susan Gray, Michael, and Paul Suhler discussed various ways to structure the text to best cover the necessary ground.

Susan Gray moved on to discuss sending a Port Login IU; how does the sending port transition to N1: Negotiating? We debated whether a port ever sends a Port Login IU from N0: Idle. After some discussion, the group agreed that it does not since:

- a. Actions only occur upon entry to a state,
- b. The port transitions to N0: Idle upon receipt of a malformed Port Login IU, and
- c. Once there the port waits for another Port Login IU.

Rod Wideman raised a point about the transmission of acknowledgement IU's. In general the state machine remains silent on these IU's, only calling them out under a few specific cases. The discussion that followed resulted in an agreement that the transition from N2: Accept Sent to N1: Negotiating doesn't belong there for the port receiving the Port Login IU.

Some further discussion revealed that the error transitions for states N1: Negotiating, N2: Accept Sent and N4: Agreed differ in some subtle ways. A port in N1 or N2 that sends a NAK transitions to N0: Idle. A port in N1, N2 or N4 that sends a NAK transitions to N1.

Susan Gray brought up a concern about receipt of the Initiate Login message in N1: Negotiating. We agreed that the text doesn't present sufficient detail. After much discussion we agreed to move the Initiate Login message back to N0: Idle and to add an additional paragraph in 4.3.3.3.2, Transition N0: Idle to N1: Negotiating, describing how the N-state machine handles the receipt of an Initiate Login message from the upper layer.

Rod Wideman pointed out that the receipt of an Initiate Login message whilst in any N-state can cause a transition to N1: Negotiating. Michael Banther argued that Rod had pointed out a general problem. Susan Gray stated that text exists governing the precedence of two negotiations, one initiated by each side.

Susan Gray led the group through various change as we sought to finalize the text. The changes include:

- a. Adding a message from the lower level to N3: Accept ACK Sent indicating the completion of the transmission of an ACK, and
- b. Changing the order of some actions and transitions so that the transitions occur before the actions (i.e., the action occurs upon entry into the state).

Paul Suhler asked, if a port in P1: Login receives a NAK IU, should it initiate the new login exchange using default operating parameters. Both Paul Suhler and Paul Entzel pointed out that sending a NAK IU in this case represents a firmware bug. Paul Entzel suggested that receipt of a NAK IU should cause reversion to default operating parameters. Susan Gray asked if the sender of a NAK IU in response to a Port Login IU should also change to default operating parameters. The group agreed that it might as well go ahead and do so since the receipt of the NAK IU on the other side will cause it to change to default operating parameters.

Michael Banther raised a concern about the link negotiation precedence text and how it interacts with the N-state machine. After some discussion he agreed that the negotiation precedence applies only to state N1: Negotiating.

Rod Wideman voiced some editorial concern over the various names used for the automation port. He will send these concerns to Paul Entzel.

Susan Gray discussed the various error types in turn. She explored with the group what changes, if any, are needed for Port Login IU's. We agreed that the receiver of a corrupt frame or of symbol framing errors can't tell if they're associated with a Port Login IU or not. Hence the text should remain general. We also agreed that recoverable errors cannot happen during link negotiation. Some debate occurred about retryable errors. Paul Entzel stated that they cannot occur during link negotiation. Susan noted that the proposed text doesn't make this distinction. She wants specific text. After some vigorous debate, the group agreed to add text in 4.7.2.2, Retryable Error (of ADTr10), qualifying its contents to only non-link service frames. Further discussion led to a re-ordering of the text and the introduction of some additional sub-clauses for context dependent behavior.

Susan Gray asked about the almost global Send Acknowledgement IU in the lower-left corner of the N-state machine diagram. We had previously agreed that it cannot be sent from N3: Accept ACK Sent (in addition to N5: Login Complete already noted in the diagram). Paul Suhler suggested adding additional text limiting the sending to exclude N3 and Susan agreed.

Susan Gray asked what a port does upon receiving a NAK IU for a link service IU other than Port Login. The group agreed to table discussion of this point until after lunch.

Susan Gray reviewed the sub-clause hierarchy she intends to include in her revised proposal. Rod Wideman summarized the discussion from lunch regarding retryable link service IU's other than Port Login. The group collectively continued to edit the revised proposal until we were satisfied with it.

Michael Banther made a motion for incorporation of 04-056r2 as revised into ADT. Paul Suhler seconded the motion. In the absence of objections or abstentions, the group passed the motion unanimously.

b. ADT Port Operating Parameters Clarification 04-062r1 Paul Suhler

Paul Suhler summarized the changes to this proposal since the last revision. He requested that we review the proposal in the light of the preceding proposal, 04-056r2.

Susan Gray noted that we use the term 'negotiated parameters' throughout the draft standard. However we do not have a definition for this term. Paul Suhler agreed to add a definition.

Paul Suhler reviewed the changes to 4.3.2.3.1, the state description for port state P1. The group collectively edited some of the proposed text.

Paul Suhler reviewed the proposed changes to 4.3.3.4.1, the description of state N1. Some of Paul's proposed text has been superseded by 04-056r2 as revised.

Paul Suhler reviewed the proposed changes to further sections. We agreed that Paul's changes should remain.

Paul Suhler made a motion for incorporation of 04-062r1 as revised into ADT. Paul Entzel seconded the motion. In the absence of objections or abstentions, the group passed the motion unanimously.

c. ADT End of Exchange 04-077r0 Michael Banther

Michael Banther reviewed the proposal. It brings in consistent text on when an exchange ends.

Rod Wideman made a motion for incorporation of 04-077r0 into ADT. Paul Suhler seconded the motion. In the absence of objections or abstentions, the group passed the motion unanimously.

d. ADT Out of Resources 04-089r0 Paul Entzel

Paul Entzel introduced the proposal.

Rod Wideman questioned whether a receiver with a resource limitation should be required to send a NAK IU. The current text contains a 'shall' clause that appears to mandate sending the NAK IU. A bit of debate resulted in agreement to make the sending of the NAK IU a 'should' clause with an additional 'shall' clause to mandate discarding the frame if the receiver does not have enough resource to send a NAK IU.

Michael Banther made a motion for incorporation of 04-089r0 as revised into ADT. Susan Gray seconded the motion. In the absence of objections or abstentions, the group passed the motion unanimously.

- e. ADI Connector Status Paul Suhler

Paul Suhler reported that Seagate has commented on missing tolerances in the SFF draft standard for the ADI connector. They will take the matter up with the SFF committee. Paul Suhler expects approval for the connector from SFF in May, 2004.

- f. ADC Letter Ballot Comment Resolution 03-385r1 Rod Wideman

Led by Rod Wideman, the group reviewed and resolved ADC letter ballot comments.

6. Unscheduled business:

- a. ADT Timeout After Baud Rate Change Paul Suhler

Paul Suhler described his concern. After a baud rate change should each port delay transmission for a period of time to ensure that the other port has also changed its baud rate. Rod Wideman asked if we can use the existing ACK Timeout period. Michael Banther and Paul Entzel objected. However, in general the group agreed on the benefit of incorporating a change. We composed a proposal captured below.

In ADTr10a as revised by 04-056r3 sub-clause 4.3.3.6.2 Transition N3: Accept ACK Sent to N5: Login Complete, change:

When the ACK IU has finished transmitting, the port shall transition to N5: Login Complete and set its operating parameters to the negotiated values.

to:

When the ACK IU has finished transmitting, the port shall transition to N5: Login Complete.

In ADTr10a as revised by 04-056r3 sub-clause 4.3.3.7.2 Transition N4: Agreed to N5: Login Complete, change:

After receiving an ACK IU for the Port Login IU it sent, the port shall transition to N5: Login Complete and set its operating parameters to the negotiated values.

to:

After receiving an ACK IU for the Port Login IU it sent, the port shall transition to N5: Login Complete.

In ADTr10a as revised by 04-056r3 sub-clause 4.3.3.8.1 State Description, change:

Upon entry into this state, a Login Process Complete shall be sent to the port state machine.

to:

Upon entry into this state, the port shall:

1. Set its operating parameters to the negotiated values,
2. Delay a period of 100 milliseconds, and

3. Send a Login Process Complete message to the port state machine.

While in this state, a port shall not transmit.

Paul Suhler made a motion for incorporation of the proposal stated above into ADT. Rod Wideman seconded the motion. In the absence of objections or abstentions, the group passed the motion unanimously.

b. ADT Review Editors Notes

Paul Entzel

Paul Entzel noted that we have already resolved the first two editor's notes in ADT.

Editor's Note 3 refers to an Abort Exchange IU which doesn't exist. Rod Wideman proposed an editorial change that removes the need for the Abort Exchange IU and resolves the issue raised by the note.

Editor's Note 4 points out that we agreed to a proposal that eliminates the INVALID EXCHANGE ID NAK Status Code but it's used in at least three different places. We concluded that the elimination of INVALID EXCHANGE ID occurred due to overlapping proposals. We agreed to eliminate the note.

Michael Banther pointed out that the NAK Status Codes use to list value 00h as reserved. More recent revisions of ADT have used this value. Keeping it as reserved leads to a simple implementation. Michael proposed changing the table of NAK Status Codes to make 00h reserved again. The proposal appears below.

Change ADTr10a table 14 to make Status Code value 00h reserved and increment the values currently 00h through 05h by one.

Michael Banther made a motion to incorporate the proposal described above into ADT. Susan Gray seconded the motion. In the absence of objections or abstentions, the group passed the motion unanimously.

Editor's Note 5 has been superseded by events and Paul Entzel will remove it.

Editor's Note 6 points out the need for either a new Encapsulated SCSI Response Code or a change to the existing INVALID FIELD IN SCSI COMMAND IU (EXCLUDES CDB) code to make it cover invalid fields in TASK MANAGEMENT REQUEST IU's as well. We agreed to the latter as an editorial change.

c. ADT Remaining in Pause and Logged Out state

Group

During discussion item (a), the group realised that problems may exist in the normative text for P3: Logged Out state and T1: Paused state. Does the current text ensure that receipt of a Port Logout whilst in P3 or Pause whilst in T1 cause a transition out of the state?

Susan Gray described the current text 4.3.2.5, P3: Logged Out State. We all agreed that the existing text is sufficient.

Susan Gray and Paul Entzel described the current text for sub-clause 4.3.4.3.2, Transition T1: Paused to T0: Active. A problem does exist here. We agreed that the inclusion of the

7. Next meeting requirements:

Paul Suhler

The group will hold a meeting 3-4 May 2004 during T10 plenary week in Monterey, CA. Subject to approval by the T10 Plenary, the meeting will begin on the 3rd no earlier than 1:00 PM and last for two hours.

8. Review new action items:

Michael Banther

- a. Susan Gray will revise 04-056r2 per discussion item (a).
- b. Paul Entzel will incorporate 04-056r2 as revised into ADT.
- c. Paul Suhler will revise 04-062r1 per discussion item (b).
- d. Paul Entzel will incorporate 04-062r1 as revised into ADT.
- e. Paul Entzel will incorporate 04-077r0 into ADT.
- f. Paul Entzel will revise 04-089r0 per discussion item (d).
- g. Paul Entzel will incorporate 04-089r0 as revised into ADT.
- h. Paul Entzel will incorporate the proposal in Unscheduled Business item (a) into ADT.
- i. Paul Entzel will incorporate the proposal in Unscheduled Business item (b) into ADT.
- j. Michael Banther will send Paul Suhler a request for investigation of the improvement described in Unscheduled Business item (f)
- k. Paul Suhler will revise 03-133r5 to request investigation of the improvement described in Unscheduled Business item (f).
- l. Paul Entzel will model ADT port definitions after ADC for terminology and SAS for the definition set.
- m. Paul Entzel will forward ADTr11 to John Lohmeyer for letter ballot.

9. Adjournment:

Group

Susan Gray made a motion for adjournment. Rod Wideman seconded the motion. The group passed the motion unanimously. Paul Suhler adjourned the group at 10:59 AM PDT on 9 March 2004.

Attendees:

Name	Organization	E-mail
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