

To: INCITS T10 Committee
From: Paul Entzel, Quantum
Date: 16 January 2003
Document: T10/04-033r1
Subject: ADT Informative Annex, Port Login Example.

1 Revision History

Revision 0:
Posted to the T10 web site 2 January 2004.

Revision 1:
Posted to the T10 web site 16 January 2004.

2 General

The members of the ADI Working Group felt that the Port Login process was complicated enough that it merited an informative annex in ADT to provide an example.

3 Proposal

Add the following annex to ADT:

Annex B (Informative)

B.1 Introduction

This annex provides an example link negotiation sequence as described in clauses 4.4 and 6.5.4. This example does not attempt to cover all of the possible cases of negotiation, only a select few that are likely to occur.

For this example, the ADT port in the automation device has the following capabilities:

- a) Support for the INCITS approved revision of this standard.
- b) Support for up to 3 frames of ACK offset.
- c) Support for frame payload sizes up to 1024 bytes.
- d) Supports Baud rates of 115K, 38.4K, 19.2K, and 9600.
- e) Always responds to a Port Login Exchange initiated by a DTD port with a Port Login exchange initiated by the automation device port (see 4.4.2)

The ADT port in the DTD has the following capabilities:

- a) Support for the INCITS approved revision of this standard as well as draft revision 9.
- b) Support for up to 2 frames of ACK offset.

- c) Support for frame payload sizes up to 512 bytes.
- d) Supports Baud rates of 57.6K, 19.2K, and 9600.

B.2 Field values common to all frames

These examples contain tables that list fields in the Port Login IUs and the values these fields contain. Table B-1 lists the fields that contain the same value for all frames described in the example and that are not negotiated.

Table B-1 Field values common to all Port Login IUs in these examples

Field	Value	Description
PROTOCOL	0	Link service.
FRAME TYPE	2	Port Login IU.
FRAME NUMBER	0	Port Login IU always 0.
PAYLOAD SIZE	8	Payload size for Port Login IU.
VENDOR SPECIFIC	0	Not used in this example.

B.3 DTD Initiates login after power-up

In this example, the ADT port in the DTD is ready to negotiate first. The ADT port in the automation device is not ready to communicate on the link until some time after the DTD.

- 1) The ADT Port in the DTD sends a Port Login IU at 9600 Baud with the parameters listed in table B-2. After sending the frame, the port starts a timer for 650 ms for the acknowledgement IU (see 4.7.1.2.1).

Table B-2 Field values for initial Port Login IU from the DTD

Field	Value	Description
X_ORIGIN	1	DTD originated.
EXCHANGE ID	0	New exchange.
ACCEPT	0	Must be zero on the first IU of an exchange.
MAJOR REVISION	1	ADT revision 1.
MINOR REVISION	0	Approved revision.
AOE	1	Abort other exchanges.
MAXIMUM ACK OFFSET	2	Maximum ACK offset that this port supports.
MAXIMUM PAYLOAD SIZE	512	Maximum payload size that this port supports.
BAUD RATE	576	Maximum baud rate that this port supports.

- 2) The ADT port in the automation device has not been configured yet, so the ADT port in the DTD receives no acknowledgement.
- 3) After 650 ms the acknowledgement timer expires in the ADT port in the DTD. The port aborts the first exchange internally and sends a new Port Login IU at 9600 Baud with a different exchange id value as shown in Table B-3.

Table B-3 Field values for second Port Login IU from the DTD

Field	Value	Description
X_ORIGIN	1	DTD originated.
EXCHANGE ID	1	New exchange.
ACCEPT	0	Must be zero on the first IU of an exchange.
MAJOR REVISION	1	ADT revision 1.
MINOR REVISION	0	Approved revision.
AOE	1	Abort other exchanges.
MAXIMUM ACK OFFSET	2	Maximum ACK offset that this port supports.
MAXIMUM PAYLOAD SIZE	512	Maximum payload size that this port supports.
BAUD RATE	576	Maximum baud rate that this port supports.

- 4) This sequence repeats with a new exchange ID each time until the ADT Port in the automation device responds.

B.4 Automation device Initiates login after power-up

In this example, the ADT port in the DTD has initiated the port login process. The ADT port in the automation device is initialized after missing a Port Login IU from the ADT port in the DTD. This demonstrates the effects of the Port Login precedence described in subclause 4.4.2.

- 1) The ADT Port in the automation device sends a Port Login IU at 9600 Baud with the parameters listed in table B-4. After sending the frame, the port starts a timer for 650 ms for the acknowledgement IU (see 4.7.1.2.1).

Table B-4 Field values for initial Port Login IU from the automation device

Field	Value	Description
X_ORIGIN	0	Automation originated.
EXCHANGE ID	0	New exchange.
ACCEPT	0	Must be zero on the first IU of an exchange.
MAJOR REVISION	1	ADT revision 1.
MINOR REVISION	0	Approved revision.
AOE	1	Abort other exchanges.
MAXIMUM ACK OFFSET	3	Maximum ACK offset that this port supports.
MAXIMUM PAYLOAD SIZE	1024	Maximum payload size that this port supports.
BAUD RATE	1152	Maximum baud rate that this port supports.

- 2) Upon receiving the Port Login IU, the ADT port in the DTD sends an ACK IU with X_ORIGIN, EXCHANGE ID, and FRAME NUMBER fields that match the Port Login IU it received. The ADT Port in the DTD then inspects the Port Login IU it received. Since it is in a new exchange and the AOE bit is set to one, the ADT port in the DTD aborts all other exchanges in progress, including the Port Login IU it had sent and for which it is awaiting an acknowledgement. After sending the ACK IU, the ADT port in the DTD sends a Port Login IU with the parameter values shown in Table B-5.

Table B-5 Field values for first reply Port Login IU from the DTD

Field	Value	Description
X_ORIGIN	0	Automation originated.
EXCHANGE ID	0	Exchange ID assigned by the automation device.
ACCEPT	0	Zero indicates that at least one field value has changed.
MAJOR REVISION	1	This value has stabilized.
MINOR REVISION	0	This value has stabilized.
AOE	1	This value has stabilized.
MAXIMUM ACK OFFSET	2	Maximum ACK offset the DTD ADT port supports.
MAXIMUM PAYLOAD SIZE	512	Maximum payload size that the DTD ADT port supports.
BAUD RATE	576	Highest baud rate supported by the DTD ADT port that is less than or equal to the value from the automation device.

- 3) Upon receiving the Port Login IU, the ADT port in the automation device sends an ACK IU with X_ORIGIN, EXCHANGE ID, and FRAME NUMBER fields that match the Port Login IU it received. The ADT Port in the automation device then inspects the Port Login IU it received. Since it is part of the exchange the automation device had originated, it is a continuation of the negotiation already in progress. After sending the ACK IU, the ADT port in the automation device sends a Port Login IU with the parameter values shown in Table B-6.

Table B-6 Field values for first reply Port Login IU from the automation device

Field	Value	Description
X_ORIGIN	0	Automation originated.
EXCHANGE ID	0	Exchange ID assigned by the automation device.
ACCEPT	0	Zero indicates that at least one field value has changed.
MAJOR REVISION	1	This value has stabilized.
MINOR REVISION	0	This value has stabilized.
AOE	1	This value has stabilized.
MAXIMUM ACK OFFSET	2	The automation ADT port can support this value. This value has now stabilized.
MAXIMUM PAYLOAD SIZE	512	The automation ADT port can support this value. This value has now stabilized.
BAUD RATE	384	Highest baud rate supported by the automation ADT port that is less than or equal to the value from the DTD.

- 4) Upon receiving the Port Login IU, the ADT port in the DTD sends an ACK IU with X_ORIGIN, EXCHANGE ID, and FRAME NUMBER fields that match the Port Login IU it received. The ADT Port in the DTD then inspects the Port Login IU it received. Since it is part of the exchange that it is currently processing, it is a continuation of the negotiation already in progress. After sending the ACK IU, the ADT port in the DTD sends a Port Login IU with the parameter values shown in Table B-7.

Table B-7 Field values for second reply Port Login IU from the DTD

Field	Value	Description
X_ORIGIN	0	Automation originated.
EXCHANGE ID	0	Exchange ID assigned by the automation device.
ACCEPT	0	Zero indicates that at least one field value has changed.
MAJOR REVISION	1	This value has stabilized.
MINOR REVISION	0	This value has stabilized.
AOE	1	This value has stabilized.
MAXIMUM ACK OFFSET	2	This value has stabilized.
MAXIMUM PAYLOAD SIZE	512	This value has stabilized.
BAUD RATE	192	Highest baud rate supported by the DTD ADT port that

		is less than or equal to the value from the automation device.
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- 5) Upon receiving the Port Login IU, the ADT port in the automation device sends an ACK IU with X_ORIGIN, EXCHANGE ID, and FRAME NUMBER fields that match the Port Login IU it received. The ADT Port in the automation device then inspects the Port Login IU it received. Since it is part of the exchange the automation device had originated, it is a continuation of the negotiation already in progress. After sending the ACK IU, the ADT port in the automation device sends a Port Login IU with the parameter values shown in Table B-8.

Table B-8 Field values for final reply Port Login IU from the automation device

Field	Value	Description
X_ORIGIN	0	Automation originated.
EXCHANGE ID	0	Exchange ID assigned by the automation device.
ACCEPT	1	One indicates all of the values in the payload are acceptable and none have been changed.
MAJOR REVISION	1	This value has stabilized.
MINOR REVISION	0	This value has stabilized.
AOE	1	This value has stabilized.
MAXIMUM ACK OFFSET	2	This value has stabilized.
MAXIMUM PAYLOAD SIZE	512	This value has stabilized.
BAUD RATE	192	This value has stabilized.

- 6) Upon receiving the Port Login IU, the ADT port in the DTD sends an ACK IU with X_ORIGIN, EXCHANGE ID, and FRAME NUMBER fields that match the Port Login IU it received. The ADT Port in the DTD then inspects the Port Login IU it received. Since it is part of the exchange that it is currently processing, it is a continuation of the negotiation already in progress. After sending the ACK IU, the ADT port in the DTD sends a Port Login IU with the parameter values shown in Table B-9.

Table B-9 Field values for final reply Port Login IU from the DTD

Field	Value	Description
X_ORIGIN	0	Automation originated.
EXCHANGE ID	0	Exchange ID assigned by automation device.
ACCEPT	1	One indicates all of the values in the payload are acceptable and none have been changed.
MAJOR REVISION	1	This value has stabilized.
MINOR REVISION	0	This value has stabilized.
AOE	1	This value has stabilized.
MAXIMUM ACK OFFSET	2	This value has stabilized.
MAXIMUM PAYLOAD SIZE	512	This value has stabilized.
BAUD RATE	192	This value has stabilized.

- 7) Upon receiving the Port Login IU, the ADT port in the automation device sends an ACK IU with X_ORIGIN, EXCHANGE ID, and FRAME NUMBER fields that match the Port Login IU it received. The ADT Port in the automation device then inspects the Port Login IU it received. Since it is part of the exchange the automation device had originated, it is a continuation of the negotiation already in progress. The ACCEPT bit set to one and no other parameters have changed indicates the negotiation process is complete. After it has successfully sent the ACK IU, the automation ADT port changes its operating parameters to match the negotiated values.

- 8) Upon receiving the ACK IU for the final Port Login IU, the ADT port in the DTD changes its operating parameters to match the negotiated values.