

To: INCITS T10 Committee  
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Document: T10/04-033r0  
Subject: ADT Informative Annex, Port Login Example.

## 1 Revision History

Revision 0:  
Posted to the T10 web site 2 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 for Baud rates of 115K, 38.4K, 19.2K, and 9600.
- e) Will always respond to a Port Login Exchange initiated by the DTD port with a Port Login exchange initiated by the automation device's 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) Support for 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 list the fields that contain the same value for all frames described in the example and 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 device.

- 1) The ADT Port in the DTD sends a Port Login IU at 9600 Baud with the parameters listed in tape 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 first IU of an exchange
MAJOR REVISION	1	ADT revision 1
MINOR REVISION	0	Approved revision
AOE	1	Abort open exchanges
MAXIMUM ACK OFFSET	2	Maximum ACK offset this port supports
MAXIMUM PAYLOAD SIZE	512	Maximum payload size this port supports
BAUD RATE	576	Maximum baud rate this port supports

- 2) The ADT port in the automation device has not been configured yet, so no acknowledgement IU is sent.
- 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	0	New exchange
ACCEPT	0	Must be zero on first IU of an exchange
MAJOR REVISION	1	ADT revision 1
MINOR REVISION	0	Approved revision
AOE	1	Abort open exchanges
MAXIMUM ACK OFFSET	2	Maximum ACK offset this port supports
MAXIMUM PAYLOAD SIZE	512	Maximum payload size this port supports
BAUD RATE	576	Maximum baud rate this port supports

- 4) This sequence continues until the ADT Port in the automation device responds.

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Editors Note: Do we want to allow the DTD's port to either stop re-trying or change the time-out value to something large to reduce the microprocessor bandwidth required to continue this process with no response?

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### **B.3 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.

- 1) The ADT Port in the automation device sends a Port Login IU at 9600 Baud with the parameters listed in tape 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 first IU of an exchange
MAJOR REVISION	1	ADT revision 1
MINOR REVISION	0	Approved revision
AOE	1	Abort open exchanges
MAXIMUM ACK OFFSET	3	Maximum ACK offset this port supports
MAXIMUM PAYLOAD SIZE	1024	Maximum payload size this port supports
BAUD RATE	1152	Maximum baud rate 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 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 was waiting for 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 automation device
ACCEPT	0	Zero indicates at least one field value has changed
MAJOR REVISION	1	This value has stabilized
MINOR REVISION	0	This value has stabilized
AOE	1	Abort open exchanges
MAXIMUM ACK OFFSET	2	Maximum ACK offset the DTD's ADT port supports
MAXIMUM PAYLOAD SIZE	512	Maximum payload size the DTD's ADT port supports
BAUD RATE	576	Highest baud rate supported by DTD's ADT port that is less than or equal to the value from 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 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 automation device
ACCEPT	0	Zero indicates at least one field value has changed
MAJOR REVISION	1	This value has stabilized
MINOR REVISION	0	This value has stabilized
AOE	1	Abort open exchanges
MAXIMUM ACK OFFSET	2	The automation's ADT port can support this value
MAXIMUM PAYLOAD SIZE	512	The automation's ADT port can support this value
BAUD RATE	384	Highest baud rate supported by automation's ADT port that is less than or equal to the value from 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 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 automation device
ACCEPT	0	Zero indicates at least one field value has changed
MAJOR REVISION	1	This value has stabilized
MINOR REVISION	0	This value has stabilized
AOE	1	Abort open exchanges
MAXIMUM ACK OFFSET	2	This value has stabilized
MAXIMUM PAYLOAD SIZE	512	This value has stabilized
BAUD RATE	192	Highest baud rate supported by DTD's ADT port that is less than or equal to the value from automation device.

- 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 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 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	Abort open exchanges
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 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	Abort open exchanges
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 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 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 change its operating parameters to match the negotiated values.