



**Streaming coordinates with the Logitech®  
io2™ with Bluetooth® digital pen**

Rev. 0.8

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## 1 Introduction

### 1.1 Purpose

This document provides the necessary information about the streaming feature implemented in the Logitech io2 Digital Pen with Bluetooth, FW version U44.24.

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For technical support, please contact [iosupport@logitech.com](mailto:iosupport@logitech.com)

## 2 System Components

This section describes the system components involved with the streaming feature.

### 2.1 Streaming paper

Streaming paper segment is defined as a template that contains only a drawing area and no pidgets.

As of the release of this document, segment 70 is the only segment enabling streaming functionality.

When using streaming paper, no coordinates are stored in the pen.

### 2.2 Pen

The pen captures images on streaming paper and translates them into logical coordinates. For non-streaming paper these coordinates are stored in flash. When using the pen on streaming paper, the coordinates are not stored, but sent over Bluetooth to a paired streaming device.

### 2.3 Streaming device

A streaming device is a device (e.g. PC, phone, PDA) with a streaming application installed. The streaming device must have a Bluetooth stack that supports the registration of SPP (Serial Port Profile) services in the SD (Service Discovery) database.

### 2.4 Streaming application

A streaming application is an application executing on a streaming device, able to receive and handle coordinates from a pen. On startup the application registers a SPP service in the Bluetooth SD database named 'ANOTOSTREAMING'. The pen will connect to this port and send data.

The pen will send coordinates from all streaming areas to the application on this port. If more than one streaming application is desired, a router component must be developed, dispatching coordinates from different page addresses to different applications

## 3 Usage model

### 3.1 Entering streaming mode

The pen enters in streaming mode when it detects streaming paper. Then it will:

- Establish a connection with the last paired device,
- Start to capture (and buffer) coordinates,
- Send coordinates to the streaming device.

#### 3.1.1 Connection establishment

First the pen tries to connect to the last paired device, it can take 1~2 seconds. The pen has an overall timeout of 10 seconds before it stops and signals MMI<sup>1</sup> feedback “Connection Failed” (See Appendix 2).

#### 3.1.2 Device selection

The Logitech io2 with Bluetooth digital pen can be paired with one PC and one mobile device (phone or PDA) at the same time. When the pen detects streaming paper, it will connect to the last paired device and initiate streaming. It means that the user selects which device the pen will stream to by re-pairing the pen with this device.

If the pen is unable to connect or the service is not available, it will signal MMI feedback “Connection Failed”.

#### 3.1.3 Coordinate streaming and buffering

During the connection establishment, the pen will buffer in RAM all captured coordinates until the connection has been successfully established or failed, and feedback “Connecting” through the MMI.

If the connection is successfully established, the buffered coordinates are sent. In case of connection failure, the buffered coordinates are lost. Since the connection establishment will take at most 10 seconds, this is also the maximum time that the pen will buffer coordinates.

When the connection is established, the pen starts to stream coordinates to the streaming device and the MMI changes to “Sending”.

The pen takes a new image every 13.3ms and streams it as logical coordinates including page address, X & Y positions and pen tip pressure value.

When the pen is lifted up, it enters in idle mode until the next event: pen down again on streaming paper or other actions (see below).

### 3.2 Leaving streaming mode

The pen leaves the streaming mode if one of the following events occurs:

- The Bluetooth connection with the streaming device is lost

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<sup>1</sup> Man Machine Interface

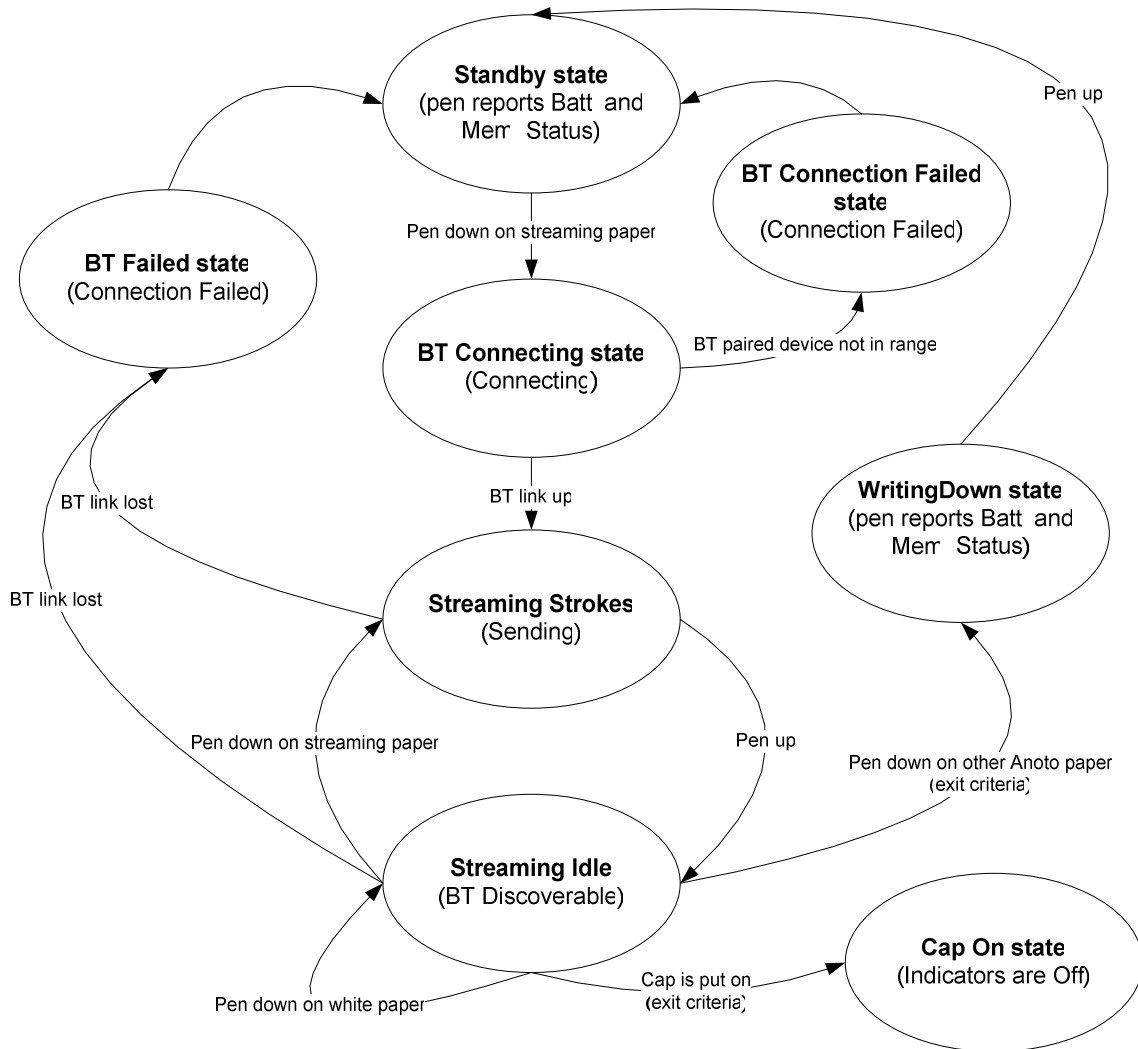
## Streaming usage in the Logitech® io2™ with Bluetooth® digital pen

- The cap is put on,
- The pen detects non-streaming paper,
- The pen is docked in the USB cradle.

The pen will always try to send all buffered data before disconnecting. This means that drawing a stroke on a streaming paper and then immediately putting the cap on will make the pen connect, send the buffered coordinates and then disconnect.

### 3.3 Pen streaming state machine and MMI

The following state machine shows pen behavior in streaming mode.



Note: MMI states are indicated between bracket and specified in appendix 2.

## 3.4 Pen behavior on different paper areas in streaming mode

### 3.4.1 Streaming segments

If not connected to the streaming device, the pen will establish the connection.  
If connected with the streaming device, the pen will stream the coordinates.

### 3.4.2 Non-streaming segments

All areas with Anoto pattern other than streaming and setting segments are considered as non-streaming areas.

The pen will disconnect from streaming device when detecting non-streaming paper.

### 3.4.3 Setting segment

Segment 0 is defined as the setting segment, this is used primarily for the stylo setting pidgets.

On this segment, the pen will store coordinates and stream them to the streaming device.

The stylo setting functionality (ink thickness, ink color) is supported in streaming mode.

### 3.4.4 White paper

White paper is a normal paper without Anoto pattern (or any other surfaces).

The pen will take no action and enter in streaming idle. It will neither send anything nor disconnect.

## 4 Technical Guide

### 4.1 Streaming data format

The streaming data format version 0.2 is detailed in [1]. For specific information about the format of stylo settings events, please contact Anoto Support.

Here is an overview of the format used by the pen. The format includes three types of messages:

- NewSession: with parameters [timestamp, penID]
- NewCoordinate: with parameters [timestamp, page address, X, Y, force]
- PenUp: with parameter [timestamp]

The first message sent after connection establishment is the NewSession message containing version information and penID.

After this, when the pen tip is down, the pen will send NewCoordinate messages at (approximately) 75 messages per second.

When the pen is lifted from the page, a PenUp message is sent. In this state, when the pen is not capturing any strokes, nothing is sent.

### 4.2 Bluetooth Serial port

Streaming feature uses the Bluetooth Serial Port Profile (SPP) for communication. The streaming application must have a SPP service named “ANOTOSTREAMING” registered in the Bluetooth service database.

### 4.3 Known limitations

Streaming format version 0.2 is not supported by any Anoto SDKs as of the release of this document.

The pen can only operate with one streaming device at one time, there is no streaming device selection system other than the pairing process.

No optimization has been made regarding image processing to meet requirements for applications demanding low latency.

Streaming uses a new paper area, therefore existing paper products cannot be used for streaming. There are no pidgets available switching on streaming functionality for other segments than segment 70.

## 5 Appendix 1: Reference Documentation

[1] Anoto Pen Streaming Format 0.2 CPS-1-553026 Rev. A June 14, 2005

## 6 Appendix 2: Pen Feedbacks for Streaming Mode

Pen state	Memory Indicator			Vibrating System	Description
	Color	Intensity	Blink		
BT Discoverable	Blue	High	Pulse every 2s	N/A	Indicates that the pen is in streaming idle mode
Connecting	Blue	High	Slow triangle wave	N/A	Connecting to the streaming device Timeout is 10s
Connection Failed	Red	High	Two pulses then solid for 2s	1s On	No paired BT device available, or BT link is lost. After the two pulses, the red light is solid to finish the timeout, then goes to Standby mode
Sending	Blue	High	Fast triangle wave	N/A	Stream coordinates to the streaming device

For more details on the pen user interface, please refer to the user manual included in the Logitech io2 with Bluetooth Business Kit, available for download at [www.logitechio.com/catalog](http://www.logitechio.com/catalog).

## 7 Appendix 3: Frequently asked questions

- **Is the streaming feature page-specific ?** Yes. The pen streams strokes only when used on the streaming paper (segment 70).
- **Are stylo settings supported in streaming mode ?** Yes. If stylo settings pidgets are used, the pen will remain in streaming mode and send to the streaming device the report corresponding to the stylo setting change.
- **What is the battery autonomy in streaming mode ?** Streaming mode draws more power as all systems inside the pen (sensing, processing, wireless) are running concurrently. The battery autonomy is estimated at up to 2 hours in Streaming Strokes mode, or up to 6 hours in Streaming Idle mode.
- **Can I downgrade a Logitech io2 Bluetooth digital pen from FW 44.24 to 44.05 ?** Yes, by using the previous version (4.1.711.1) of the Digital Pen Firmware Updater, currently available on [www.logitechio.com/catalog](http://www.logitechio.com/catalog) as part of the “Logitech io2 with Bluetooth Business Kit”
- **Can I use the Bluetooth Digital Pen Configuration Utility with FW 44.24 ?** No, this configuration utility software is only suitable for use with FW 44.05. To configure a pen with FW 44.24 or above, Logitech io2 Software version 4.0.843.1 or above must be used.
- **Is the Logitech io2 Software 4.0 compatible with both Logitech pen models ?** Yes, this software version is compatible with both the Logitech io2 and Logitech io2 Bluetooth digital pens.
- **Why is there a new firmware for the Logitech io2 (USB) digital pen ?** FW 38.16 updates the list of supported templates and corrects miscellaneous bugs, including:
  - clearing of stylo settings strokes from the memory after download,
  - a bug correction in the handling of template updates,
  - other minor corrections in the Man Machine Interface.

## 8 Appendix 4: feature and compatibility summary table

	Logitech io2 with Bluetooth	Logitech io2 (USB)
PGC push via Bluetooth	FW 44.05 and above	N/A
NBOS via Bluetooth	FW 44.05 only	N/A
NBOS via USB	N/A	Yes
USB download	FW 44.24 and above	Yes
Coordinates streaming	FW 44.24 and above	N/A
Barcode reading	FW 44.24 and above	N/A
Latest Consumer PC SW available	4.0.843.1	4.0.843.1
Latest Enterprise PC SW available	N/A (April 1 <sup>st</sup> 2006)	3.3.631
Latest Firmware available	44.24	38.16