Technical Bulletin

ExpressCard 2000 Tipping and Emboss Areas
Document Number 99875631

Table 1.1 - Revisions

Rev Number	Date	Notes
1.01	09/12/2013	Initial Release
2.01	9/20/2013	Add information on coordinates, font spacing, font sizes

1 Introduction

The ExpressCard 2000 (EC2000) provides features for embossing characters on cards and for tipping those embossed characters with foil. Introductions to embossing and foil tipping are provided in *99875600 ExpressCard 2000 User Installation and Operation Manual*, and details for developing custom card designs are provided in *99875611 ExpressCard 2000 Programming Reference Manual / Windows XML Specification*. This technical bulletin provides supplemental information pertaining to the emboss and tipping areas of custom card XML designs created using that reference.

2 Tipping and Emboss Areas

2.1 Caution About Emboss and Tipping Areas

The emboss and tipping areas of the EC2000 are governed by ISO/IEC 7811. To allow customers additional flexibility for custom applications, the EC2000 will allow embossing outside the area defined by that standard, but MagTek Engineering strongly recommends only creating card designs that fall within that area. Non-conformant designs can cause issuance and usage problems, including cards that could prematurely wear out card feeding mechanisms, or jam in card slots and conveyors.

2.2 EC2000 Tipping Area

The outer boundaries where the EC2000's foil tipper can cover a CR80 card are shown in **Figure 2-1**.
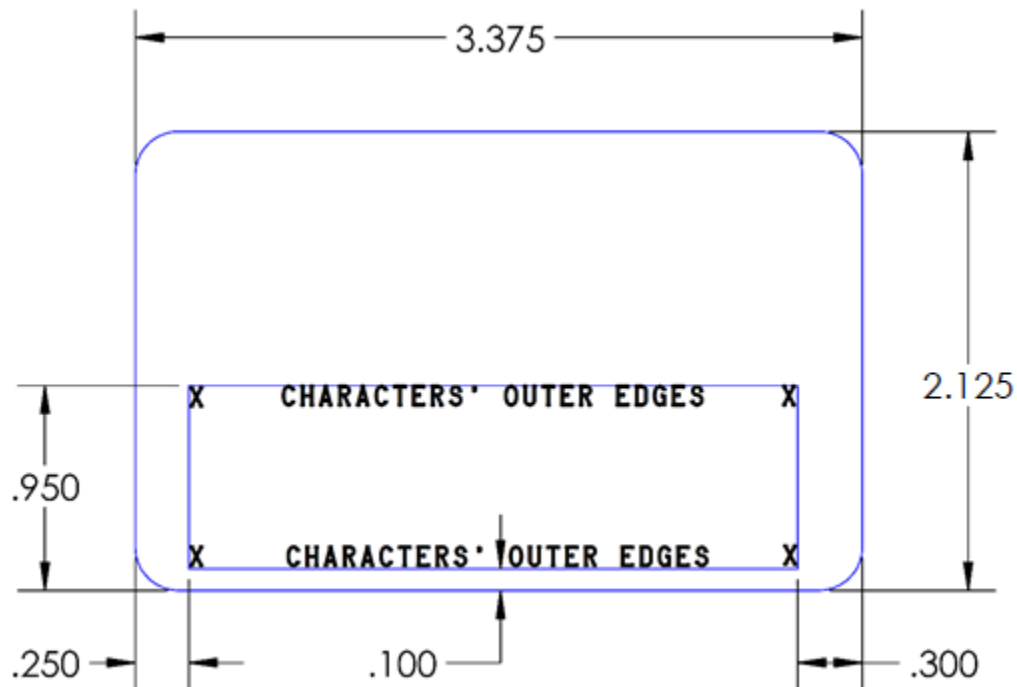
Figure 2-1 - Tipping Area Defined by Character Edges

To make sure a design stays within the specified boundaries, developers must take into account font dimensions and spacing, device calibration, string lengths, and so on. Some experimentation, testing, and careful measurement are generally necessary during the design process to make sure the XML will produce the desired results in all use cases.

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2.3 Converting Measurements To XML Coordinates

When developing custom XML, it is often necessary to convert physical measurements in a design or specification into EC2000 XML coordinates. This section provides details to assist with conversion.

It is important to note that the placement and scaling of the coordinate system are affected by settings found in the Tuning (Embossing) page, so it is advisable to perform measurements to find the actual coordinate system origin (0,0) for your application.

2.3.1 Coordinate System and Distances

EC2000 XML coordinates are specified in 0.01 (1/100) inch increments. For example, the distance between the point (**10**,200) and the point (**11**,200) is 0.01 inches. The theoretical boundaries of a CR80 card are therefore from (0,0) at the upper left corner to approximately (337,212) at the lower right corner. The exact placement of the origin depends on the EC2000's calibration settings – primarily the **Card Offset X** and **Card Offset Y** settings found in **Menu** > **Settings** > **Tuning**.
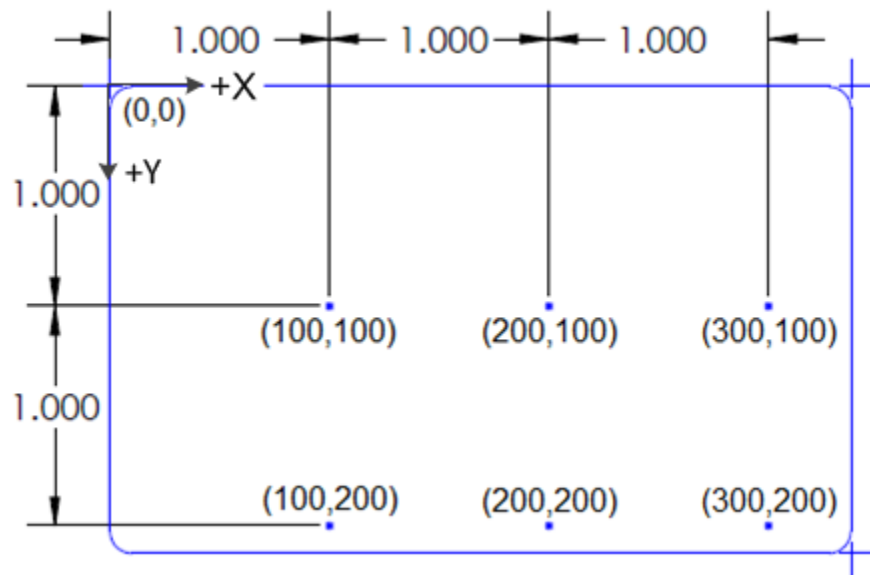

Figure 2-2 - EC2000 Coordinate System

Knowing the origin and coordinate system size, it becomes straightforward to find the approximate locations of the tipping area boundaries shown in **Figure 2-1**:

- Left boundary at X = 25
- Right boundary at X = 307
- Upper boundary at Y = 117
- Bottom boundary at Y = 202

2.3.2 Character Placement

The EC2000 places the **upper left corner** of a character at the coordinates specified in the XML. If your design specifies character centers, you must take the nominal font height and width into account when choosing coordinates.
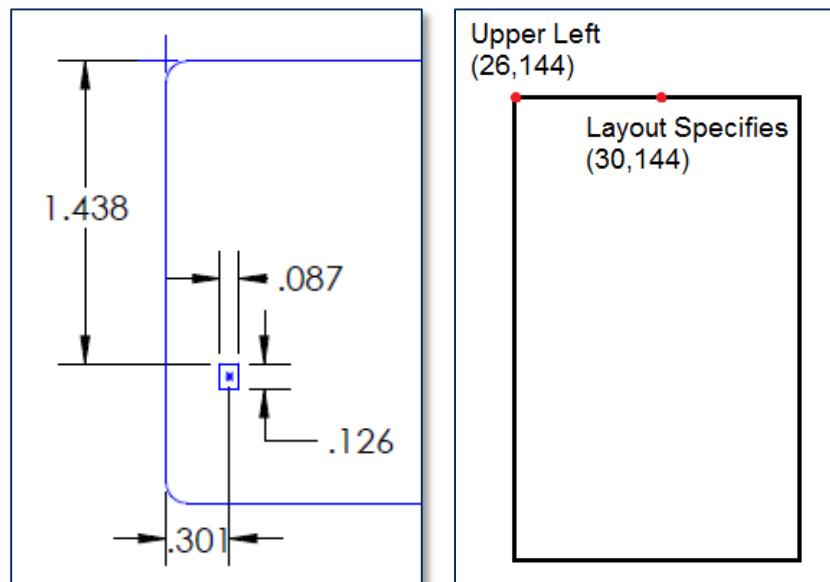
For example, **Figure 2-3** shows a design where the position of the first character in the Primary Account Number (PAN) is specified by its centerpoint at a position that translates to coordinates (40, 128). FontID1 has a nominal character height of 0.17 inches and a nominal character width of 0.10 inches, so

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you would start with XML that places the upper left corner 0.17/2 inches higher and 0.10/2 inches further to the left than the centerpoint, giving coordinates **(35,120)**. To account for calibration and other factors, you should then measure the actual character position on an issued card, and adjust the XML until the character is embossed in the specified location.
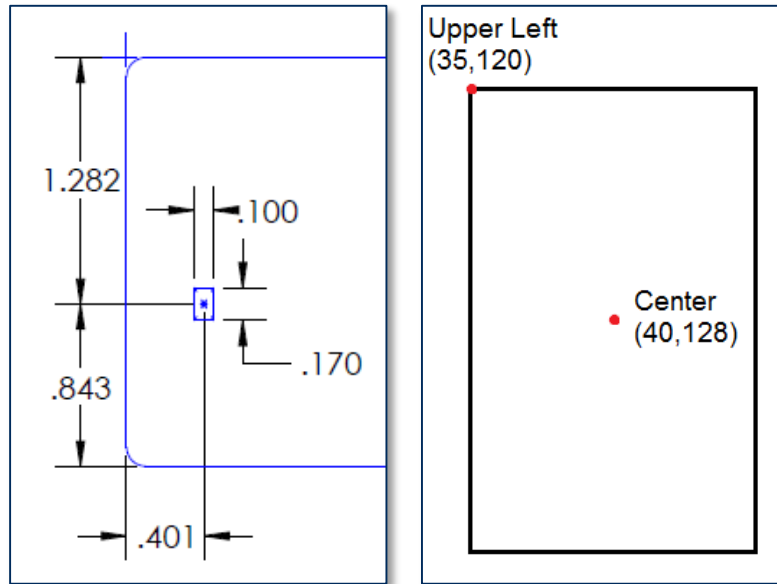
Figure 2-3 - FontID1 Layout Measurements to XML Example

Figure 2-4 shows a second design where the position of the first character in the name string is specified by its top boundary and horizontal center at a position that translates to (30,144). FontID2 has a nominal character height of 0.126 inches and a nominal character width of 0.087 inches, so you would start with XML that places the upper left corner 0.087/2 inches further to the left than the layout point, giving coordinates of **(26, 144).** Measure and adjust the XML as in the previous example.

Figure 2-4 - FontID2 Layout Measurements to XML Example

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2.3.3 Characters Per Inch

Given a fixed starting coordinate for an embossed string, determining the length of string that will fit within the boundaries requires understanding the nominal and configured characters per inch (CPI) value for each of the four fonts on the embosser wheel.

The CPI value for each font can be found by navigating to **Menu** > **Settings** > **Tuning** > **Advanced…**. The settings on that page labeled **FontID1**, **FontID2**, **FontID3**, and **FontID4** show the number of **thousandths of an inch** the embosser will place between the centers of characters in an embossed string that uses that font. The CPI for a given font can be calculated by dividing 1000 by that number.

For example, if **FontID1** is set to a value of 143, the EC2000 will place 143/1000 inches between each character. Inverting that gives 1000/143 characters per inch, or 7 CPI. Nominally, FontID1 (Farrington 7B) is specified as a 7 CPI font, and FontID2 (Standard Gothic) is specified as a 10 CPI font.

2.3.4 Maximum String Lengths

The final consideration when managing boundaries is the absolute length limit of strings: Regardless of placement, FontID1 has a maximum string length of 22 characters; FontID2 has a maximum string length of 30 characters; FontID3 and FontID4 have "soft" maximum string lengths of 35 characters.

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