Computerized Parking Lot Registration System Project

Subgroup: Cue Cat Barcode Reader
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I. Introduction to the Cue Cat

The Cue Cat is a commercial barcode reader from Digital Convergence, Inc. The Cue Cat is shaped like a cat, which is a parody of the common computer mouse, hence its name. The Cue Cat connects to a PS/2 port with an added extension to allow simultaneous keyboard and barcode reader operation. It is capable of reading barcodes from right to left and vice-versa, most probably due to the splitting of the LED beam. The following table indicates the barcode type and symbology supported by the Cue Cat, taken from Stephen Satchell's website [1]:

Barcode Type	Symbology
CC <startcode>	Digital Convergence Cue (<startcode> can be any value 01/! through 94/~ inclusive)
C39	Code 39 (basic set only)
128	Code 128, code B and C only, no intermix
E28	EAN/UUC 128
UPA	UPC-A, no supplemental digits
UA2	UPC-A, two supplemental digits
UA5	UPC-A, five supplemental digits
UPE	UPC-E, no supplemental digits
UE2	UPC-E, two supplemental digits
UE5	UPC-E, five supplemental digits
E08	EAN-8, no supplemental digits
E82	EAN-8, two supplemental digits
E85	EAN-8, five supplemental digits
E13	EAN-13, no supplemental digits
E32	EAN-13, two supplemental digits
E35	EAN-13, five supplemental digits
ITF	Interleaved 2-of-5
IBN	Booklan, no supplemental digits
IB5	Booklan, five supplemental digits
CBR	Codabar

Table 1: List of Cue Cat-supported barcode types and symbologies.

II. Principles of Operations

The method used by the Cuecat barcode reader to return information from scanned barcodes is fairly simple. First, the PS/2 connection of the reader emits standard IBM PC/AT keyboard codes, which is interpreted by the keyboard controller in the IBM-compatible personal computer and the software driver in the BIOS or operating system (MS-DOS, Windows, OpenBSD, BeOS, etc). The keyboard codes generate keystrokes that correspond to keyboard characters. [1]

Here are some examples of the output of the barcode reader, taken from Satchell's page [1]:

alt+F10 **.C3nZC3nZC3nZCNzYDNPYC3nX.CNf7.edCMmYSMlwmqiJCGkYyVlW.** *<enter>*
alt+F10 **.C3nZC3nZC3nZCNzYDNPYC3nX.aabI.F39-FN5+Fx19.** *<enter>*
alt+F10 **.C3nZC3nZC3nZCNzYDNPYC3nX.cGf2.ENr7CNz0DxjZD3rZDNzWENP6.** *<enter>*
alt+F10 **.C3nZC3nZC3nZCNzYDNPYC3nX.cGf2.ENr7CNz0DxjZD3v6ENzWENP6.** *<enter>*
alt+F10 **.C3nZC3nZC3nZCNzYDNPYC3nX.cGf2.ENr7CNz0DxjZD3v7CxzWENP6.** *<enter>*

As is easy to inspect, the code consists of the "header", a period, a series of graphic characters, a second period, a much shorter series of graphic characters, a third period, a series of graphic characters, a fourth period, and an ENTER code.

The four periods are delimiters. The header indicates which barcode type is currently being read, and which can be interpreted by using Table 1. The second field of data remains constant for any one reader, therefore, it must be an identification number for the Cue Cat. It has been established that the final field is the actual number to be decoded from the barcode. Using a base-64 scheme, shown below, the keystrokes and characters generated by the Cue Cat can be decoded into their normal decimal equivalents. [1]

```
abcdefghijklmnop
qrstuvwxyzABCDEF
GHIJKLMNOPQRSTUV
WXYZ0123456789??
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For example, to decode the characters, ‘C3nZ’, generated by the Cue Cat, one must first find their positions in the scheme above. C is at position 28 (the count begins with a 0), 3 is at 55, n is at 13 and z is at 51. Then the positions are converted into 6-bit binary numbers resulting in:

C	3	n	Z
28	55	13	51
011100	110111	001101	110011

If the characters are grouped into 8-bit fields, the result is a constant pattern of three ‘01110011’. Subtracting a delta value of ‘01000011’ (or the ASCI value of C) results in another pattern, which is then XOR-ed with the previous pattern to achieve the final complete bit-field.

III. Conclusion

The Cue Cat is a very useful tool which can be integrated into the computerized parking lot system. It supports many barcode types and allows bidirectional reading of barcodes. Since the correct decoding procedure has been found, the process can be implemented using software such as C or Visual Basic. The results from this step can be interfaced with a database to allow searches and identity validation for users of the parking lot.

IV. References

[1] http://www.fluent-access.com/wtpapers/cuecat/index.html