Introduction to Application Notes

Situation

Microvision created a "simple and affordable" bar code scanner designed for use in a variety of industries. The reader-base ranged from end users to integrators and developers. Microvision published a newsletter with bar code and scanning related topics. I wrote the sections "Tech Tips" and "You Ask, We Answer." The newsletter articles where reformatted and added to the corporate knowledgebase. This knowledgebase was used by the corporate Product Support team, integrators, and end users. This short document contains a sample of the Application Note articles.

Range of Topics

Application Note topics included coding samples, general information, how to use the scanner, integration with other software packages, etc. Contact me to review the other Application Note articles.

Application Note: Converting UPC to ISBN

Situation

Printed material such as books and magazines use a UPC code to uniquely identify them. Libraries and other agencies identify printed material using an ISBN number. Printed media normally includes a bar coded UPC number but the ISBN number is usually NOT bar coded. Sometimes it is useful to convert the UPC number to an ISBN number which is the subject of the Application Note.

Conversion

The UPC to ISBN conversion is a fairly straight-forward process that involves copying characters from the UPC number and adding a new check digit character. As an example consider the UPC value of "9781568303062" as printed on a book:

Separate the UPC into these parts:	Ignore	ISBN	Check Digit
	978	156830306	2

The ISBN number for this UPC is 1-56830-306-8 where the final "8" is a check digit character.

Calculating the Check Digit

To complete the ISBN number you need to calculate the check digit. In the above example, the ISBN check digit is "8". To calculate the check digit, multiply each digit in the ISBN by a value starting at 10 and decrementing with each character in the ISBN. That is,

ISBN	1	5	6	8	3	0	3	0	6
Multiplier	10	9	8	7	6	5	4	3	2
Value	10	45	48	56	18	0	12	0	12

To calculate the check digit:

1. Sum all of the number in the Value row and you get a total of 201.
2. Take the total (201 in this case), divide it by 11, and calculate the remainder. In this case, the remainder after dividing by 11 is 3. In computer lingo, take the sum modulo 11 (still a value of 3).
3. Take the remainder and subtract it from 11. In this case, 11 - 3 is 8. The "8" is the check digit. Sometimes this subtraction will yield a value of 10 or 11. If the result was 10 then use "X" for the check digit. If the value was 11 then use "0" for the check digit.

Application Note: Bar Coded Menu Cards

Situation

We have been asked on numerous occasions why the Flic Scanner does not include a display, or a keypad, or some other function buttons. Some applications would benefit from the ability to scan an item number and then enter a quantity or some other information. Microvision designed the Flic Scanner to be simple and affordable. Added a display or keypad would increase the cost and complicate the programming of the scanner. This would mean adding an operating system, a file system to store the data, communications routines to move the data, etc. This would require a development environment, tools, support, etc. As you can see this takes us out of the "simple and affordable" paradigm that makes the Flic Scanner the Flic Scanner that we know and love. Besides, other companies offer some very nice devices that do this already. These devices also come with some very impressively large price tags (that is to say, they are NOT simple and affordable).

Equipment and System Details

- Flic operating primarily in Batch mode
- Host computer with application capable of processing quantity fields, or
- Host computer with spreadsheet and wedge software

Main Concerns

The main goals are to increase the data collecting ability of the Flic Scanner, to maintain the integrity of the scanned data, and to make the data collection operation simple for the end user. Here are some reasons why users may want to capture additional information:

- Scan an item number and then scan a quantity.
- Scan different lists of items for different purposes. For example, scan a list of items to add to inventory and another list of items to remove from inventory.
- Want the ability to delete an item scanned by mistake.

Recommendation

You can a create menu card that encodes useful values and functions. Users can scan bar codes on the menu card to increase the versatility and functionality of the scanner. The host computer can process menu card bar codes, read quantity bar codes, associate quantities with the item numbers, and create meaningful formatted data.

Solution Details

Variation 1
Create a menu card with the digits "0" through "9" bar coded. You may want to encode the digits with a "Q" prefix so your host software can more easily recognize the quantity values. You may also include a bar code with the word "CLEAR" encoded. If you want

to enter an item number and a quantity of 123 then scan the item number and then scan the "Q1", "Q2", and "Q3" bar codes. The host application can then combine the digits into 123. If you scanned an incorrect digit then scan the "CLEAR" bar code and re-enter the digits. This method assumes that you are writing the host application you can program the application to properly handle the quantity digits (with the appropriate error checking).

Variation 2
Create a menu card with the digits "0" through "9" bar coded. Also print the numbers "10", "20", "30", through "90" bar coded. You may want to encode the digits with a "Q" prefix so your host software can more easily recognize the quantity values. If you want to enter an item number and a quantity of 23 then scan the item number and then scan the "Q20" and "Q3" bar codes.

Variation 3
This variation is similar to Variation 2 but is designed to scan data into rows and columns of a spreadsheet using a wedge program. Create a menu card with "0" through "9" and "10", "20", "30", through "90" bar coded. To enter a quantity of 59 scan the item number, the "50" bar code, the item number, and the "9" bar code. Set the wedge software to move from the quantity column to the item number column of the next row. The above example results in two rows of data each with an item number and each with a quantity. The host computer can then analyze the spreadsheet data and combine the quantity values if desired. This is not an elegant solution but it can be implemented with existing off-the-shelf applications and requires no custom programming.

Conclusion

Keep in mind that the "simple and affordable" Flic scanner is merely capturing data. Your host application must interpret the raw scanned data and take the appropriate actions. Your host application must read the raw data collected by the Flic Scanner and turn that raw data into meaningful information. That is, if you scanned quantity bar codes then the host must assemble the separate quantity digits into a final number. You can use the Microvision SDK to provide the basic interface to the scanner and then add application functionality to parse and format the raw scanned data.

Creating Dense Menu Cards

Sometimes you need to create menu cards containing lots of bar codes. If you place these bar codes side by side on your menu card then the scanner may not be able to read them reliably. The scanner needs a "quiet zone" around the bar code so that it can determine where the bar code starts and ends. If you offset the bar codes on your menu card then you can make the bar codes easier to read while still having a very dense menu card.

This type of formatting dramatically increases the density of the bar codes while still making them easy to scan. The key here is offsetting the bar codes. The offset creates ample whitespace around each bar code.

Bar Code Desc 1

Bar Code Desc 15

Bar Code Desc 8

Bar Code Desc 22

Bar Code Desc 2

Bar Code Desc 16

Bar Code Desc 9

Bar Code Desc 23

Bar Code Desc 3

Bar Code Desc 17

Bar Code Desc 10

Bar Code Desc 24

Bar Code Desc 4

Bar Code Desc 18

Bar Code Desc 11

Bar Code Desc 25

Bar Code Desc 5

Bar Code Desc 19

Bar Code Desc 12

Bar Code Desc 26

Bar Code Desc 6

Bar Code Desc 20

Bar Code Desc 13

Bar Code Desc 27

Bar Code Desc 7

Bar Code Desc 21

Bar Code Desc 14

Bar Code Desc 28