Barcode Scanner Module

Overview:

The module is described as a small 1D/2D code reader that uses intelligent image recognition algorithms to quickly and accurately decode barcodes or 2D codes on paper or screen. It features onboard USB and UART interfaces, making it suitable for direct connection to computers or integration into various devices due to its small form factor.

Features:

The manual lists the following features of the barcode scanner module:

- Easy to use, requiring no knowledge of image recognition
- Decodes common 1D/2D codes such as Barcodes, QR codes, etc.
- Onboard micro USB and UART serial port for connection with computers or embedded devices
- Configurable via scanning 'configuration code'
- The onboard light source for operation in the dark

Command Instructions:

Here is a comprehensive list of command instructions, outlining the primary functionality associated with each command. Feel free to review and modify any commands according to your requirements.

1. Common_setting:

a. Common_setting is used for control some common functions like Onboard Led_indicator On/Off, Buz_Indicator, Target_light (Red Light), Light (White Light), and Changing Mode like Manual mode, Command mode, Continuous mode, Sensing mode.

b. For example, if you want to enable Target_light then write function like **[0x7E, 0x00, 0x08, 0x01, 0x00, 0x00, LED_Indicator_En + Buz_Indicator_En + Target_light_En + Light_Com + Command_Mode, 0xAB, 0xCD]**

c. Suppose, If you want to Off Buz_Indicator and Onboard Led_indicator then write functions like **[0x7E, 0x00, 0x08, 0x01, 0x00, 0x00, LED_Indicator_Dis + Buz_Indicator_Dis + Target_light_Com + Light_Com + Command_Mode, 0xAB, 0xCD]**

d. So all functions of Common_setting are below:

- LED_Indicator_En = 0x80
  - Always On
- LED_Indicator_Dis = 0x00

        - Always Off
    - Buz_Indicator_En = 0x40
        - Always On
    - Buz_Indicator_Dis = 0x00
        - Always Off
    - Target_light_Dis = 0x00
        - Always Off
    - Target_light_Com = 0x10
        - Off after scanning
    - Target_light_Keep = 0x20
        - Always On
    - Light_Dis = 0x00
        - Always Off
    - Light_Com = 0x04
        - Off after scanning
    - Light_Keep = 0x08
        - Always On
    - Manual_Mode = 0x00
        - Manual Mode is the default scanning mode. In this mode, the user should press the button to begin scanning, and it will finish after the scanned or the button release
    - Command_Mode = 0x01
        - In command mode, the scanner will begin scanning after receiving the command from the MCU.
    - Continous_Mode = 0x02
        - In Continuous Mode, the module will keep scanning automatically. After it success scanning and output the result, or reach the timeout of scanning time, the module will begin its next scan after a certain time
    - Sensor_Mode = 0x03
        - The module will detect the ambient brightness, if the brightness changes, the module will begin scanning after an image stabilization time (configurable). After one scanning (success or timeout), the module will enter the detecting state again after a certain time (configurable). The module will keep this cycle unless: If timeout, the module will stop scanning and in detecting state automatically.

2. Scan_Command:

a. It functions by delivering a trigger pulse to initiate the scanning function of the barcode scanner module.

3. Setting_code:

a. Users could set the setting codes to configure the Barcode Scanner Module.

b. So all functions of Setting_code are below:
    - Close = 0x02
        - Close Setting code
    - Open = 0x00
        - Open Setting code
    - With = 0x01
        - Output content of Setting code
    - Without = 0x00
        - Without content of Setting code

4. Image_Stabilization_Time:

a. It is the time for the module to stabilize the image if the brightness change is detected in sensing mode.

5. Scan_Interval_Setting:

a. The duration between each successive scanning event. Scan_Interval_Setting it's works in the continuous mode. So First, Change to the continuous mode then try with demo code.

6. Time_of_single_scanning:

a. In Continuous Mode, this parameter sets the max scanning time for per scanning behavior. If the module succeeds in scanning or its scanning time reaches the max single scanning time, it will enter the non-scanning interval. The range of single scanning time should be 0.1~25.5s. If it is set to 0, it means that the scanning time is infinite. Time_of_single_scanning it's works in the continuous mode. So First, Change to the continuous mode then try with demo code.

7. Auto_Sleep_Function:

a. When operating in manual mode, the module can transition into sleep mode after remaining inactive for a certain duration.
b. So all functions of Auto_Sleep_Function are below:
    - On = 0x80
        - Enable Sleep mode
    - Off = 0x00
        - Disable Sleep mode
    - Idle_time = 0x00
        - 0x00 - 0x7F : (unit：100ms) for address 0x0007 And 0x00 - 0xFF: (unit：100ms) for address 0x0008

8. Warning_tone:

a. You can set the buzzer to active/passive buzzer and the driving frequency of passive buzzer.

b. 0x00：Buzzer 0x01-0xFF：Passive buzzer (freq=Value*20)

9. Duration_of_warning_tone:

a. Set the time of playing the warning tone.
b. 0x00-0xFF；0-255ms

10. CapsLock_And_Buzzer:

a. You can set the scanned word's capitalization process and also control the Buzzer activity.
b. So all functions of CapsLock_And_Buzzer are below:
    - Dis = 0x00
        - CapsLock Disable (capitalization process disable)
    - En = 0x02
        - CapsLock Enable (capitalization process Enable)
    - High = 0x00
        - The buzzer is always High for idle and Low for busy.
    - Low = 0x01
        - The buzzer is always Low for idle and High for busy.

11. Set_Interface:

a. You can set the interface option like UART_Output or USB_Output.
b. So all functions of Set_Interface are below:
    - UART_Output = 0x00
        - For set UART interface.
    - USB_Output = 0x01
        - For set USB interface.
    - USB_Virtual_Port = 0x03
        - For set USB Virtual Port interface (Comport interface).

12. Buzzer_setting:

a. You can set the buzzer activity like on or off music and Enable or disable the decoding tone.
b. So all functions of Buzzer_setting are below:
    - Dis_music = 0x02
        - Disable start music
    - En_music = 0x00
        - Enable start music
    - Open_T = 0x04
        - Enable decoding tone (Will play beep tone while data is decoded)
    - Close_T = 0x00
        - Disable decoding tone (Nothing will ring while data is decoded)

13. Sensitivity_parameter_1 And Sensitivity_parameter_2:

a. This is the sensitivity of the module switch working mode (idle/work).

14. Exposure_High And Exposure_Low:

a. Exposure Data-High Bits:
    - High bits typically represent the more significant part of the exposure data.
    - In the context of image or signal processing, "high bits" often refer to the more significant bits in a binary representation of a value.
    - These bits may contain information about the brighter areas of the scanned image, capturing details in regions with higher levels of light.

b. Exposure Data-Low Bits:
    - Low bits represent the less significant part of the exposure data.
    - In binary representation, low bits are associated with lower-order positions.
    - These bits may capture details in darker or lower-intensity areas of the scanned image.

15. Same_barcode_setting:

a. To prevent redundant scanning of identical barcodes, you can implement a delay mechanism. If the module scans the same barcode again, it will compare the timestamp of the current scan with the timestamp of the last scan. Only if the time difference exceeds the specified delay time, the result will be outputted; otherwise, the duplicate barcode will be discarded.

b. So all functions of Same_barcode_setting are below:
    - En_delay = 0x80
        - Set the Delay of the same barcode.
    - Dis_delay = 0x00
        - Disable delay of the same barcode
    - Delay_time
        - You can set the delay time between 0.1 to 12.7 seconds. 0 represents infinite delay time.

16. Switch_of_all_barcodes:

a. With this setting code, you can enable/disable all types of barcodes. If you disable all types of barcodes, only the setting code is scannable, and also You can set the scan area of the module for different applications.

b. So all functions of Switch_of_all_barcodes are below:
    - Disable_all_barcodes = 0x00
        - Disable all types of barcodes and QR codes.
    - Enable_all_barcodes = 0x02

        - Enable all types of barcodes and QR codes.
    - Enable_default_barcodes = 0x04
        - Enable default types of barcodes and QR codes.
    - Scan_area = 0x00
        - 0x00 for the Whole area and 0x08 for the Center area. If the scan area is whole size, the module will scan from center to edge, the barcode can be set are any place in the image. If the scan area is only the center, you must set the barcode on the center of the image, otherwise, it isn't scanned.

17. Baudrate_set:

a. To ensure successful communication when connecting the module to the MCU via the UART interface, it is imperative to configure the UART communication parameters correctly. The default parameters for the UART interface of the module are as follows: Baud rate - 9600 bps, Data bit - 8, Stop bit - 1.
b. You can set the baud rate as per the below listed:
    - BR_1200
    - BR_4800
    - BR_9600
    - BR_14400
    - BR_19200
    - BR_38400
    - BR_57600
    - BR_115200

18. All_barcode_&_QRCode_settings:

a. You can control all barcode settings from here like enabling and disabling specific barcodes, Setting maximum detecting range, Setting minimum detecting range, Etc.
b. From the list below, you can check which barcodes you can control.
    - EAN13 (Enable and Disable)
    - EAN8 (Enable and Disable)
    - UPCA (Enable and Disable)
    - UPCE0 (Enable and Disable)
    - UPCE1 (Enable and Disable)
    - Code128 (Enable and Disable)
        - Also, you can set the Minimum and Maximum length of Code128 scanned results.
    - Code39 (Enable and Disable)
        - Also, you can set the Minimum and Maximum length of Code39 scanned results.
    - Code93 (Enable and Disable)
        - Also, you can set the Minimum and Maximum length of Code93 scanned results.

- CodeBar (Enable and Disable)
    - Also, you can set the Minimum and Maximum length of CodeBar scanned results.
- QR_code (Enable and Disable)
- Interleaved_2of5 (Enable and Disable)
    - Also, you can set the Minimum and Maximum length of Interleaved_2of5 scanned results.
- Industrial_25 (Enable and Disable)
    - Also, you can set the Minimum and Maximum length of Industrial_25 scanned results.
- Matrix_2_of_5 (Enable and Disable)
    - Also, you can set the Minimum and Maximum length of Matrix_2_of_5 scanned results.
- Code11 (Enable and Disable)
    - Also, you can set the Minimum and Maximum length of Code11 scanned results.
- MSI (Enable and Disable)
    - Also, you can set the Minimum and Maximum length of MSI scanned results.
- RSS_14 (Enable and Disable)
- Limited_RSS (Enable and Disable)
- Expanded_RSS (Enable and Disable)
- RSS_min_length
- RSS_max_length
- DM (Enable and Disable)
- PDF417 (Enable and Disable)

19. Keyboard_Setting:

a. To ensure compatibility with diverse keyboard layouts across various countries, there are specific keyboard setting codes available for selection. Check below:
    - US = 0x00
    - Czech = 0x01
    - France = 0x02
    - Germany = 0x03
    - Hungary = 0x04
    - Italy = 0x05
    - Japan = 0x06
    - Spain = 0x07
    - Turkey_F = 0x08
    - Turkey_Q = 0x09

20. Enhanced_Functionality_Integration:

a. You can set the enhanced functions like changing the Prefix and suffix data, RF data, Code ID, Data intercept setting, etc.

b. For example, If you want to add prefix data then **First** write a function like Enhanced_Functionality_Integration = bytes([0x7E, 0x00, 0x08, 0x01, 0x00, 0x60, Without_End_Char + Without_Suffix + Without_Code_ID + **Add_Prefix** + Without_RF + none, 0xAB, 0xCD]), **Second** set the Prefix Length here: Prefix_Length = 0x20 (0x00 :0, 0x10 :1, 0x20 :2, ..., 0xF0 :15), **Third** now set the prefix data Prefix_data = bytes([0x7E, 0x00, 0x08, 0x01, 0x00, 0x64 (0x63 - 0x71 Address), 0x64 (#0x00 - 0xFF ASCII-hex Max 15Byte), 0xAB, 0xCD]) You can find ASCII hex from our manual https://files.waveshare.com/upload/d/dd/Barcode_Scanner_Module_Setting_Manual_EN.pdf
c. For example, If you want to use it to indicate failed scanning in some modes then you have to set the RF Information.
d. For example, If you want to remove the starting character from a scanned result then you have to Length_of_interception_M.
e. If you want to remove the ending character from a scanned result then you have to Length_of_interception_N

21. Main_Settings:

a. You can configure the Factory and User settings like Restore_Factory_Setting, Restore_user_Setting, Save_user_Setting, SAVE_TO_FLASH, light_sleep, Deep_sleep, And wake_up.