Barcode Scanner

User Manual

2D

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1. Scanner Basic Characteristics

1.1 Output Setting Content

Setting code content (such as "WFFD980") can be allowed to output. Scanning "Code Programming output content" and setting up successfully, the setting code content will be output to the host when reading setting code. When the “Code Programming output content” is enabled, setting code only as an ordinary bar code can not be used to set the Scanning Engine. When reading engine re-power,it will be return to default setting---Code programming not output content, at this time the setting code can be used to set the scanner engine

Code Programming output content

W401740

Default setting

WFFD980

1.2 Default Setting

Note: Please use the "Factory Default" function cautiously.

After scanning "Factory Default",scanning engine will lose the current parameter settings, instead of it is factory default parameters .

The factory default parameters and functions can be found in Appendix A

1.3 Communication Interface

1.3.1 Serial communication interface

Engine provide TTL-232 serial communication interface and USB interface to communicate with the host connection. Through the communication interface, it can receive reading data, control the instruction from the recognition engine, and modify the recognition engine function parameters. The recognition engine parameters can be modified through the reading setting code, but o

1.3.1.1 Baud Rate

Baud Rate's unit is bit/s, The optional configuration parameters are as below:

Parameters	Default
Serial Communication Type	Standard TTL-232
Baud Rate	9600
Check	None
Data bits	8
Stop bit	1
Hardware Flow Control	None

9600

WFFD9D3

1200

WFFD9D0

19200

WFFD9D5

2400

WFFD9D1

38400

WFFD9D6

4800

WFFD9D2

57600

WFFD9D7

14400

WFFD9D4

115200

WFFD9D8

1.3.2 USB Interface

When reading engine connects to the host by USB cable, the system will use USB DATAPIPE MODE automatically.

1.3.2.1 USB DATAPIPE

DATAPIPE USB is a custom USB transport protocol. This feature requires the installation of the corresponding driver on the host.

Switch to USB DATAPIPE Mode

W030D00

1.3.2.2 USB HID-KBW

When using the USB interface, you can simulate the engine to read HID-KBW equipment. In this mode, reading engine will become a virtual keyboard output data to the host.

Switch to USB HID-KBW Mode

W030D01

1.3.2.3 Standard Keyboard Input Mode

Standard keyboard input mode is the factory default setting .EM2000 reading engine provides another two input modes: Keyboard simulation input character mode and emulation input control character mode. It can be set according to the users's needs.

Switch to Standard keyboard input mode

W066000

1.3.2.4 Keyboard simulation input character mode

In order to input any ASCII character(16 hexadecimal value from 0x00～0xFF) in any kind of language, the virtual Keyboard can be set as Keyboard simulation input character mode. When using this combination of characters output, because of the large output data, the speed will slow down.

After switching to "Keyboard simulation input character mode", input the data corresponding ASCII character, the scanner will read the code with virtual keyboard as below:

(1) Keep pressing the "ALT"

(2) According to the character code, input the number keys in the digital keyboard in turns.

(3) Release "ALT"

Switch to Keyboard Simulation Input Character Mode

W066004

Note: It is recommended that you turn Num Lock on the main numeric keypad when Enabling this mode.

1.3.2.5 Emulation Input Control Character Mode

The HEX from 0x00~0x1F of ASCII values could be matched to some control function keys, In emulation keyboard, the control function keys input as bellows:

(1) Keep pressing “Ctrl”

(2) Press the pointed control keys (the specific ASCII values match the keys details see below table<Emulation keyboard Input Control Characters Pairing Table>)

(3) Release the “Ctrl” and control keys

Switch to Emulation Input Control Character Mode

W066002

1.3.2.6 Emulation keyboard Input Control Characters Pairing Table

ASCII Value (HEX)	Function Key	ASCII Value (HEX)	Function Key
00	2	10	P
01	A	11	Q
02	B	12	R
03	C	13	S
04	D	14	T

05	E	15	U
06	F	16	V
07	G	17	W
08	H	18	X
09	I	19	Y
0A	J	1A	Z
0B	K	1B	[
0C	L	1C	\
0D	M	1D	]
0E	N	1E	6
0F	O	1F	.

1.3.2.7 Countries/Languages Keyboard Options

The language of different countries corresponding to the keyboard layout, symbols are not the same. According to the actual needs, Recognition engine can switch to different countries' keyboard system. The default is set to the first system---US English .

1.US English

WFF6B00

2.Belgium

WFF6B01

3.Brasil

WFF6B02

4.Canada

WFF6B03

5.Czechoslovakia

WFF6B04

6.Denmark

WFF6B05

7.Finland

WFF6B06

8.France

WFF6B07

9.Austria

WFF6B08

10.Greece

WFF6B09

11.Hungary

WFF6B0A

12.Israel

WFF6B0B

13.Italy

WFF6B0C

14.Latin America

WFF6B0D

15.Netherlands

WFF6B0E

16.Norway

WFF6B0F

17.Poland

WFF6B10

18.Portugal

WFF6B11

19.Romania

WFF6B12

20.Russia

WFF6B13

21.Slovakia

WFF6B15

22.Spain

WFF6B16

23.Sweden

WFF6B12

24.Switzerland

WFF6B18

25.Turkey1

WFF6B19

26.Turkey2

WFF6B1A

27.Britain

WFF6B1B

28.Japan

WFF6B1C

1.3.2.8 Unknown Characters Beep

Due to the existence of language differences in the keyboard, some characters which appears in the bar code but not shown in the current emulation keyboard system and cannot be sent. Through the following setting to decide whether the reading engine send an error tone or not.

If you scan “no-warning”, there is no warning tone when the error happens. If you scan “warning”, there will be a warning tone when the barcode includes unknown characters.

Warning

W080E08

no-warning

W080E00

1.3.2.9 Press Key Interval Delay Setting

Press key interval is the time between release the key and press the key.

0ms

WC06F00

5ms

WC06F40

10ms

WC06F80

15ms

WC06FC0

1.3.2.10 Caps Lock

When Scanning “Turn on Caps Lock”, reading engine will convert the lower-case and capitals in the barcode information same as the open state of Caps Lock on the host keyboard.

Turn off Caps Lock

W086000

Turn On Caps Lock

W086008

Note: When use the “Keyboard simulation input character mode”or “Uppercase and Lowercase Enforce Transformation”, this function is not valid.

For example: Turn on this function, reading engine reads the data for the "AbC" code, but host will receive "aBc".

1.3.2.11 Uppercase and Lowercase Enforce Transformation

If scan “All Turn to Uppercase”, no matter the letters in the barcode is capitals or lowercase, all the letters change to capitals.

If scan “All Turn to Lowercase”, no matter the letters in the barcode is capitals or lowercase, all the letters change to lowercase.

No Conversion

W306F00

All Convert to Lowercase

W306F30

AllConvert to Uppercase

W306F20

For example: After scanning “All Turn to Lowercase” ,the reading information is “AbC”, the host will receive “abc”.

1.3.2.12 Emulation Number Mini Keyboard

Turn off this function, all output data is as big keyboard corresponding keys.

Turn on this function, when Num Lock is turned on, the scanner decoded number is from “0-9”,the output data is as emulation number mini keyboard corresponding keys. If the scanner decoded number is excluded from “0-9”, and including the characters of “+” “_” “*” “/” “.”, the output data is as big keyboard corresponding keys. When Num Lock is turned off, all output data is as big keyboard corresponding keys. When Num Lock is turned on, all output data is as emulation number mini keyboard corresponding keys.

Turn On

W046F04

Turn Off

W046F00

Note: Please confirm “Num Lock” turns on when you use this function.

1.3.2.13 USB COM Port Emulation

If you connect the engine to the Host via a USB connection, the USB COM Port Emulation feature allows the Host to receive data in the way as a serial port does. However, you need to set communication parameters on the engine to match the Host requirements. A driver is required for this feature.

USB COM Port Emulation

W030D02

1.3.2.14 HID-POS

The HID-POS interface is recommended for new application programs. It can send up to 56 characters in a single USB report and appears more efficient than USB HID-KBW.

Features:

1) HID based, no custom driver required.
2) Way more efficient in communication than USB HID-KBW and traditional RS-232 interface.

Note: HID-POS does not require a custom driver. However, a HID interface on Windows 98 does. All HID interfaces employ standard driver provided by the operating system. Use defaults when installing the driver.

HID-POS

W030D03

2. Scan Mode

2.1 Manual Mode

Manual Mode (default): A trigger pull activates a decode session. The decode session continues until the barcode is decoded or the trigger is released .

Manual Mode

W030000

2.2 Continuous Mode

Continuous Mode: The engine automatically activates a decode session. The decode session continues until the barcode is decoded or the decode session timeout expires. When a decode session is completed, the engine waits until the timeout between decodes expires and then starts next session. The engine continues to work in this pattern if the following situation does not happen: no barcode is presented to the engine or passed in front of it in a decode session, the engine will automatically suspend barcode reading. Pressing the trigger can suspend/resume barcode reading.

Continuous Mode

W030002

2.2.1 Decode Session Timeout

This parameter sets the maximum time decode session continues during a scan attempt. It is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 5.0s. If the parameter is set to 0, the engine scans and decodes barcode

continuously. To learn how to program this parameter, see Appendix D: Parameter Programming Examples.

Decode Session Timeout

M00031D

2.2.2 Timeout between Decodes

This parameter sets the timeout between decode sessions. When a decode session ends, next session will not happen until the timeout between decodes expires. It is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 1.0s. To learn how to program this parameter, see Appendix D: Parameter Programming Examples

Timeout between Decodes

M00031C

2.3 Sense Mode

Sense Mode: The engine waits for the image stabilization timeout to expire before activating a decode session every time it detects a change in ambient illumination. Decode session continues until the barcode is decoded or the decode session timeout expires. After a decode session ends, the engine waits for the timeout between decodes to expire before beginning to monitor ambient illumination. If no barcode is presented to the engine or passed in front of it in a decode session, the engine will automatically suspend barcode reading and start to monitor ambient illumination.

In the Sense mode, a trigger pull can also activate a decode session. The decode session continues until the barcode is decoded or the trigger is released. When the session ends, the engine will continue to monitor ambient illumination.

Sense Mode

W030003

2.3.1 Decode Session Timeout

This parameter sets the maximum time decode session continues during a scan attempt. It is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 5.0s. If the parameter is set to 0, the engine scans and decodes barcode continuously. To learn how to program this parameter, see Appendix D: Parameter Programming Examples.

Decode Session Timeout

M00031D

2.3.2 Timeout between Decodes

After a decode session ends, the engine waits for the timeout between decodes to expire before beginning to monitor ambient illumination. This parameter is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 1.0s. To learn how to program this parameter, see AppendixD Parameter Programming Examples

Timeout between Decodes

M00031C

2.3.3 Image Stabilization Timeout

The engine waits for the image stabilization timeout to expire before activating a decode session every time it detects a change in ambient illumination. This parameter is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 0.4s. To learn how to program this parameter, see Appendix D: Parameter Programming Examples

Image Stabilization Timeout

M00031B

2.3.4 Sensitivity

Sensitivity specifies the degree of acuteness of the engine's response to changes in ambient illumination. The higher the sensitivity, the lower requirement in illumination change to trigger the engine. You can select an appropriate degree of sensitivity that fits the ambient environment. The default setting is Medium Sensitivity.

High Sensitivity

WFF0308

Medium Sensitivity

WFF0320

Low Sensitivity

WFF0340

Custom Sensitivity

M00031A

Sensitivity levels range from 0 to 255. The smaller the number, the higher the sensitivity.

Users can select a desired sensitivity level that helps achieve greater efficiency. To learn how to program this parameter, see AppendixD: Parameter Programming Examples

2.4 Command Trigger Mode

Command Trigger Mode: Decode session is activated by a host command (i.e. set the bit0 of register 0x0002 to “1”). The decode session continues until the barcode is decoded or the decode session timeout expires.

Command Trigger Mode

W030001

2.4.1 Decode Session Timeout

This parameter sets the maximum time decode session continues during a scan attempt. It is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 5.0s. If the parameter is set to 0, the engine scans and decodes barcode continuously. To learn how to program this parameter, see Appendix D: Parameter Programming Examples.

Decode Session Timeout

M00031D

3. Illumination & Aiming

3.1 Illumination

A couple of illumination options are provided to improve the lighting conditions during every image capture:

Normal (default): Illumination LED is turned on during image capture.

Always ON: Illumination LED keeps ON after the engine is powered on.

OFF: Illumination LED is OFF all the time.

Normal

W0C0004

OFF

W0C0000

Always ON

W0C000C

3.2 Aiming

When scanning/capturing image, the engine projects an aiming beam which allows positioning the target barcode within its field of view and thus makes decoding easier.

Normal (default): The engine projects an aiming beam only during barcode scanning/capture.

Always ON: Aiming beam is constantly ON after the engine is powered on.

OFF: Aiming beam is OFF all the time.

Normal

W300010

OFF

W300000

Always ON

W300030

4. Notification Beeps

4.1 Mute Mode

Scanning the Enable Mute Mode can turn off all notification beeps. By default, mute mode is disabled.

Enable Mute Mode

W400000

Disable Mute Mode

W400040

4.2 Good Read Beep

Scanning the Good Read Beep Off can turn off good read beeps. Scanning the Good Read Beep On, the good read beeps will be restored.

Good Read Beep On

W040E04

Good Read Beep Off

W040E00

4.2.1 Good Read Beep Frequency

Low

WFF09DA

Medium

WFF094B

High

WFF0925

4.2.2 Good Read Beep Duration

40ms

WFF0A1F

80ms

WFF0A3E

120ms

WFF0A5D

4.3 Good Read LED

Good Read LED On

W800080

Good Read LED Off

W800000

4.4 Decode Result Notification

When enabled, if a barcode does not decode, “F” is transmitted; if a barcode is decoded, “S” is appended to the barcode data as the most left character.

Note: This function is invalid under the USB DATAPIPE MODE.

Enable Decode Result Notification

W400240

Disable Decode Result Notification

W400200

5. Data Formatting

In many applications, barcode data needs to be edited and distinguished from one another.

Usually AIM ID and Code ID can be used as identifiers, but in some special cases terminating character suffix like Carriage Return or Line Feed can also be the alternative.

The engine can be configured to transmit barcode data in the following format:

[“F”/ “S”] + [Code ID] + [AIM ID] + [DATA] + [terminating character]

Barcode’s data must be transmitted while others are optional parts.

5.1 AIM ID Prefix

AIM (Automatic Identification Manufacturers) IDs define symbology identifiers and data carrier identifiers. For the details, see Appendix B: AIM ID Table. If AIM ID prefix is enabled, the engine will add the symbology identifier before the scanned data after decoding.

Enable AIM ID Prefix

WFFD9C0

Disable AIM ID Prefix

WFFD9C1

5.2 CODE ID Prefix

Code ID can also be used to identify barcode type. For more information, refer to Appendix C: Code ID Table

Enable CODE ID Prefix

W800280

Disable CODE ID Prefix

W800200

User can choose to transmit original CODE ID or visible CODE ID by scanning the appropriate barcode below. Refer to Appendix C: Code ID Table.

Original CODE ID

W018A00

Visible CODE ID

W018A01

5.3 Terminating Character Suffix

A terminating character such as carriage return (CR) or carriage return/line feed pair (CRLF) or horizontal tab (TAB) can be used to mark the end of data.

Disable Terminating Character Suffix

W616000

Append CR

W616001

Append CRLF

W616021

Append TAB

W616041

6. Symbologies

6.1 Global Settings

6.1.1 Enable/Disable All Symbologies

If all symbologies are disabled, the engine can only identify programming barcodes.

Enable All Symbologies

WFFD981

Disable All Symbologies

WFFD982

6.1.2 Enable/Disable 1D Symbologies

Scanning the following code set, only for all one-dimensional bar code type unified operation, or allow all reading, or total ban on reading.

Enable 1D Symbologies

WFFD983

Disable 1D Symbologies

WFFD984

6.1.3 Enable/Disable 2D Symbologies

Scanning the following code set, only for all two-dimensional bar code type unified operation, or allow all reading, or total ban on reading.

Enable 2D Symbologies

WFFD985

Disable 2D Symbologies

WFFD986

6.1.4 Video Reverse

Regular barcode: Dark image on a bright background.

Inverse barcode: Bright image on a dark background.

The examples of regular barcode and inverse barcode are shown below.

Regular barcode

Inverse barcode

Video Reverse ON: Read both regular barcodes and inverse barcodes.

Video Reverse OFF (default): Read regular barcodes only.

The engine shows a slight decrease in scanning speed when Video Reverse is ON.

Video Reverse ON

W100210

Video Reverse OFF

W100200

6.2 1D Symbologies

6.2.1 Code 128

6.2.1.1 Restore Factory Defaults

Restore the Factory Defaults of Code 128

WFFD990

6.2.1.2 Enable/Disable Code 128

Enable Code 128

W011601

Disable Code 128

W011600

6.2.1.3 UCC/EAN-128 (GS1-128)

Restore the Factory Defaults of UCC/EAN-128

WFFD991

Enable UCC/EAN-128

W011701

Disable UCC/EAN-128

W011700

6.2.1.4 AIM 128

Restore the Factory Defaults of AIM 128

WFFD992

Enable AIM 128

W101610

Disable AIM 128

W101600

6.2.2 EAN-8

6.2.2.1 Restore Factory Defaults

Restore the Factory Defaults of EAN-8

WFFD994

6.2.2.2 Enable/Disable EAN-8

Enable EAN-8

W011301

Disable EAN-8

W011300

6.2.2.3 Transmit Check Digit

EAN-8 is 8 digits in length with the last one as its check digit used to verify the integrity of the data.

Transmit EAN-8 Check Digit

W041304

Do Not Transmit EAN-8 Check Digit

W041300

6.2.2.4 Extending Code

An EAN-8 barcode can be augmented with a two-digit or five-digit extending code to form a new one. Examples as below, the part surrounded by blue dotted line is an EAN-8 barcode while the part circled by red dotted line is add-on code.

Enable 2-Digit Extending Code

W101310

Disable 2-Digit Extending Code

W101300

Enable 5-Digit Extending Code

W201320

Disable 5-Digit Extending Code

W201300

Enable 2-Digit Extending Code/ Enable 5-Digit Extending Code: The engine decodes a mix of EAN-8 barcodes with and without 2-digit/5-digit extending codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The engine decodes EAN-8 and ignores the add-on code when presented with an EAN-8 plus add-on barcode. It can also decode EAN-8 barcodes without add-on codes.

6.2.2.5 Extending Code Required

EAN-8 Extending Code Required

W081308

EAN-8 Extending Code Not Required

W081300

6.2.2.6 EAN-8 EXTEND TO EAN-13

EAN-8 extend to EAN 13 means add five leading zeros to decoded EAN-8 barcodes to extend to13 digits.

Enable EAN-8 Zero Extend

W401340

Disable EAN-8 Zero Extend

W401300

6.2.3 EAN-13

6.2.3.1 Restore Factory Defaults

Restore the Factory Defaults of EAN-13

WFFD995

6.2.3.2 Enable/Disable EAN-13

Enable EAN-13

W011101

Disable EAN-13

W011100

6.2.3.3 Transmit Check Digit

EAN-13 is 13 digits in length with the last one as its check digit used to verify the integrity of the data.

Transmit EAN-13 Check Digit

W041104

Do Not Transmit EAN-13 Check Digit

W041100

6.2.3.4 Add-On Code

An EAN-13 barcode can be augmented with a two-digit or five-digit extending code to a new one. Examples as below, the part surrounded by blue dotted line is an EAN-13 barcode while the part circled by red dotted line is extending code.

Enable 2-Digit Extending Code

W101110

Disable 2-Digit Extending Code

W101100

Enable 5-Digit Extending Code

W201120

Disable 5-Digit Extending Code

W201100

Enable 2-Digit Extending Code/ Enable 5-Digit Extending Code: The engine decodes a mix of EAN-13 barcodes with and without 2-digit/5-digit Extending codes.

Disable 2-Digit Extending Code/ Disable 5-Digit Extending Code: The engine decodes EAN-13 and ignores the Extending code when presented with an EAN-13 plus Extending barcode. It can also decode EAN-13 barcodes without Extending codes.

6.2.3.5 Extending Code Required

EAN-13 Extending Code Required

W081108

EAN-13 Extending Code Not Required

W081100

6.2.3.6 ISSN

Restore the Factory Defaults of ISSN

WFFD996

Enable ISSN

W401140

Disable ISSN

W401100

6.2.3.7 ISBN

Restore the Factory Defaults of ISBN

WFFD997

Enable ISBN

W011201

Disable ISBN

W011200

ISBN-13

W041200

ISBN-10

W041204

6.2.4 UPC-E

6.2.4.1 Restore Factory Defaults

Restore the Factory Defaults of UPC-E

WFFD998

6.2.4.2 Enable/Disable UPC-E

Enable UPC-E

W011501

Disable UPC-E

W011500

6.2.4.3 Transmit Check Digit

UPC-E is 8 digits in length with the last one as its check digit used to verify the integrity of the data.

Transmit UPC-E Check Digit

W041504

Do Not Transmit UPC-E Check Digit

W041500

6.2.4.4 Extending Code

A UPC-E barcode can be augmented with a two-digit or five-digit Extending code to form a new one. Examples as below, the

part surrounded by blue dotted line is a UPC-E barcode while the part circled by red dotted line is Extending code.

Enable 2-Digit Add-On Code

Disable 2-Digit Add-On Code

Enable 5-Digit Add-On Code

Disable 5-Digit Add-On Code

Enable 2-Digit Extending Code/ Enable 5-Digit Extending Code: The engine decodes a mix of UPC-E barcodes with and without 2-digit/5-digit Extending codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Extending Code: The engine decodes UPC-E and ignores the Extending code when presented with a UPC-E plus Extending barcode. It can also decode UPC-E barcodes without Extending codes.

6.2.4.5 Extending Code Required

UPC-E Extending Code Required

UPC-E Extending Code Not Required

6.2.4.6 Transmit System Character

The first character of UPC-E barcode is the system character “0”.

Transmit System Character “0”

W081508

Do Not Transmit System Character “0”

W081500

6.2.4.7 UPC-E Extension

Enable UPC-E Extend

W801580

Disable UPC-E Extend

W801500

6.2.5 UPC-A

6.2.5.1 Restore Factory Defaults

Restore the Factory Defaults of UPC-A

WFFD999

6.2.5.2 Enable/Disable UPC-A

Enable UPC-A

W011401

Disable UPC-A

W011400

6.2.5.3 Transmit Check Digit

UPC-A is 13 digits in length with the last one as its check digit used to verify the integrity of the data.

Transmit UPC-A Check Digit

W041404

Do Not Transmit UPC-A Check Digit

W041400

6.2.5.4 Extending Code

A UPC-A barcode can be augmented with a two-digit or five-digit Extending code to form a new one. In the examples below, the part surrounded by blue dotted line is a UPC-A barcode while the part circled by red dotted line is Extending code.

Enable 2-Digit Extending Code

Disable 2-Digit Extending Code

Enable 5-Digit Extending Code

Disable 5-Digit Extending Code

Enable 2-Digit Extending Code/ Enable 5-Digit Extending Code: The engine decodes a mix of UPC-A barcodes with and without 2-digit/5-digit Extending codes.

Disable 2-Digit Extending Code/ Disable 5-Digit Extending Code: The engine decodes UPC-A and ignores the Extending code when presented with a UPC-A plus Extending barcode. It can also decode UPC-A barcodes without Extending codes.

6.2.5.5 Extending Code Required

UPC-A Extending Code Required

W101410

UPC-A Extending Code Not Required

W101400

6.2.5.6 Transmit Preamble Character

Transmit Preamble Character “0”

W081408

Do Not Transmit Preamble Character “0”

W081400

Note: The preamble character “0” usually does not appear in printed UPC-A barcodes, so the first byte of the printed barcode maybe not “0”.

6.2.6 Interleaved 2 of 5

6.2.6.1 Restore Factory Defaults

Restore the Factory Defaults of Interleaved 2 of 5

WFFD99A

6.2.6.2 Enable/Disable Interleaved 2 of 5

Enable Interleaved 2 of 5

W011801

Disable Interleaved 2 of 5

W011800

6.2.6.3 Check Digit Verification

A check digit is optional for Interleaved 2 of 5 and can be added as the last digit. It is a calculated value used to verify the integrity of the data.

Disable: The engine will not read barcode data for verification.

.

Do Not Transmit Check Digit After Verification: The engine checks the integrity of all Interleaved 2 of 5 barcodes to verify that the data complies with the check digit algorithm. Barcodes passing the check will be transmitted except the last digit, whereas those failing it will not be transmitted.

Transmit Check Digit After Verification: The engine checks the integrity of all Interleaved 2 of 5 barcodes to verify that the data complies with the check digit algorithm. Barcodes passing the check will be transmitted, whereas those failing it will not be transmitted.

Disable

W0C1800

Do Not Transmit Check Digit After Verification

W0C1804

Transmit Check Digit After Verification

W0C180C

6.2.6.4 Transmit Appended “0”

If an Interleaved 2 of 5 barcode contains an odd number of characters, a leading zero must be appended. Scan the appropriate barcode to choose whether to transmit the appended “0”.

Transmit Appended “0”

W101800

Do Not Transmit Appended “0”

W101810

6.2.6.5 ITF-6

ITF-6 is a special kind of Interleaved 2 of 5 with a length of 6 characters and the last character as the check character.

Restore the Factory Defaults of ITF-6

WFFD99B

Disable ITF-6

W011900

Enable ITF-6 But Do Not Transmit Check Digit

W051901

Enable ITF-6 and Transmit Check Digit

W051905

Note: It is advisable not to enable ITF-6 and Interleaved 2 of 5 at the same time.

6.2.6.6 ITF-14

ITF-14 is a special kind of Interleaved 2 of 5 with a length of 14 characters and the last character as the check character.

Restore the Factory Defaults of ITF-14

WFFD99C

Disable ITF-14

W201800

Enable ITF-14 But Do Not Transmit Check Digit

WA01820

Enable ITF-14 and Transmit Check Digit

WA018A0

Note: It is advisable not to enable ITF-14 and Interleaved 2 of 5 at the same time.

6.2.6.7 Matrix 2 of 5

Restore the Factory Defaults of Matrix 2 of 5

WFFD99F

Enable Matrix 2 of 5

W011A01

Disable Matrix 2 of 5

W011A00

6.2.6.8 Check Digit Verification

Disable

W041A00

Do Not Transmit Check Digit After Verification

W0C1A04

Transmit Check Digit After Verification

W0C1A0C

6.2.7 Industrial 25

6.2.7.1 Restore Factory Defaults

Restore the Factory Defaults of Industrial 25

WFFD9A0

6.2.7.2 Enable/Disable Industrial 25

Enable Industrial 25

W081908

Disable Industrial 25

W081900

6.2.7.3 Check Digit Verification

Disable

W201900

Do Not Transmit Check Digit After Verification Transmit Check Digit After Verification

W601920

W601960

6.2.8 Standard 25

6.2.8.1 Restore Factory Defaults

Restore the Factory Defaults of Standard 25

WFFD9A1

6.2.8.2 Enable/Disable Standard 25

Enable Standard 25

W101A10

Disable Standard 25

W101A00

6.2.8.3 Check Digit Verification

Disable

W401A00

Do Not Transmit Check Digit After Verification

WC01A40

Transmit Check Digit After Verification

WC01AC0

6.2.9 Code 39

6.2.9.1 Restore Factory Defaults

Restore the Factory Defaults of Code 39

WFFD9A2

6.2.9.2 Enable/Disable Code 39

Enable Code 39

W011C01

Disable Code 39

W011C00

6.2.9.3 Transmit Start/Stop Character

Code 39 bar code data before and after each have a character as the start and terminator, it can be set or not be set output.

Transmit Start/Stop Character

W041C04

Do Not Transmit Start/Stop Character

W041C00

6.2.9.4 Check Digit Verification

Disable

W081C00

Do Not Transmit Check Digit After Verification

W181C08

Transmit Check Digit After Verification

W181C18

6.2.9.5 Enable/Disable Code 39 Full ASCII

The engine can be configured to identify all ASCII characters by scanning the appropriate barcode below.

Enable Code 39 Full ASCII

W201C20

Disable Code 39 Full ASCII

W201C00

6.2.10 CODABAR

6.2.10.1 Restore Factory Defaults

Restore the Factory Defaults of Codabar

WFFD9A3

6.2.10.2 Enable/Disable Codabar

Enable Codabar

W011E01

Disable Codabar

W011E00

6.2.10.3 Check Digit Verification

Disable

W101E00

Do Not Transmit Check Digit After Verification

W301E10

Transmit Check Digit After Verification

W301E30

6.2.10.4 Transmit Start/Stop Character

Codebar bar code data before and after each have a character as the start and terminator, it can be set or not be set output.

Transmit Start/Stop Character

W021E02

Do Not Transmit Start/Stop Character

W021E00

6.2.10.5 Start/Stop Character Format

The starting and ending symbols of the codabar can be set to any of the following formats.

ABCD/ABCD as the Start/Stop Character

W0C1E00

ABCD/TN*E as the Start/Stop Character

W0C1E04

abcd/abcd as the Start/Stop Character

W0C1E08

abcd/tn*e as the Start/Stop Character

W0C1E0C

6.2.11 Code 93

6.2.11.1 Restore Factory Defaults

Restore the Factory Defaults of Code 93

WFFD9A4

6.2.11.2 Enable/Disable Code 93

Enable Code 93

W081208

Disable Code 93

W081200

6.2.11.3 Check Digit Verification

Disable

W201200

** Do Not Transmit Check Digit After Verification

W601220

Transmit Check Digit After Verification

W601260

6.2.12 Code 11

6.2.12.1 Restore Factory Defaults

Restore the Factory Defaults of Code 11

WFFD9A5

6.2.12.2 Enable/Disable Code 11

Enable Code 11

W011D01

Disable Code 11

W011D00

6.2.12.3 Check Digit Verification

Disable

W1C1D00

One Check Digit, MOD11

W1C1D04

Two Check Digits, MOD11/MOD11

W1C1D08

Two Check Digits, MOD11/MOD9

W1C1D0C

One Check Digit, MOD11 (Len <= 11)
Two Check Digits, MOD11/MOD11 (Len > 11)

W1C1D10

One Check Digit, MOD11 (Len <= 11)
Two Check Digits, MOD11/MOD9 (Len > 11)

W1C1D14

Transmit Check Digit

W201D20

Do Not Transmit Check Digit

W201D00

6.2.13 Plessey

6.2.13.1 Restore Factory Defaults

Restore the Factory Defaults of Plessey

WFFD9A6

6.2.13.2 Enable/Disable Plessey

Enable Plessey

W011F01

Disable Plessey

W011F00

6.2.13.3 Check Digit Verification

Disable

W021F00

** Do Not Transmit Check Digit After Verification

W061F02

Transmit Check Digit After Verification

W061F06

6.2.14 MSI-Plessey

6.2.14.1 Restore Factory Defaults

Restore the Factory Defaults of MSI-Plessey

WFFD9A7

6.2.14.2 Enable/Disable MSI-Plessey

Enable MSI-Plessey

W081F08

Disable MSI-Plessey

W081F00

6.2.14.3 Check Digit Verification

Disable

W301F00

One Check Digit, MOD10

W301F10

Two Check Digits, MOD10/MOD10

W301F20

Two Check Digits, MOD10/MOD11

W301F30

Transmit Check Digit

W401F40

Do Not Transmit Check Digit

W401F00

6.2.15 RSS-14

6.2.15.1 Restore Factory Defaults

Restore the Factory Defaults of RSS-14

WFFD9A8

6.2.15.2 Enable/Disable RSS-14

Enable RSS-14

W011B01

Disable RSS-14

W011B00

6.2.15.3 Transmit Application Identifier “01”

Transmit Application Identifier “01”

W041B04

Do Not Transmit Application Identifier “01”

W041B00

6.2.16 RSS-Limited

6.2.16.1 Restore Factory Defaults

Restore the Factory Defaults of RSS-Limited

WFFD9A9

6.2.16.2 Enable/Disable RSS-Limited

Enable RSS-Limited

W081B08

Disable RSS-Limited

W081B00

6.2.16.3 Transmit Application Identifier “01”

Transmit Application Identifier “01”

W201B20

Do Not Transmit Application Identifier “01”

W201B00

6.2.17 RSS-Expand

6.2.17.1 Restore Factory Defaults

Restore the Factory Defaults of RSS-Expand

WFFD9AA

6.2.17.2 Enable/Disable RSS-Expand

Enable RSS-Expand

W401B40

Disable RSS-Expand

W401B00

6.3 2D Symbologies

6.3.1 PDF417

6.3.1.1 Restore Factory Defaults

Restore the Factory Defaults of PDF417

WFFD9B0

6.3.1.2 Enable/Disable PDF417

Enable PDF417

W010C01

Disable PDF417

W010C00

6.3.2 Data Matrix

6.3.2.1 Restore Factory Defaults

Restore the Factory Defaults of Data Matrix

WFFD9B1

6.3.2.2 Enable/Disable Data Matrix

Enable Data Matrix

W080C08

Disable Data Matrix

W080C00

6.3.2.3 Rectangular Barcode s

Decode Rectangular Barcodes

W034B03

Do Not Decode Rectangular Barcodes

W034B00

6.3.2.4 Mirror Images

Decode Unmirrored DM Only

W0C4A00

Decode Mirrored DM Only

W0C4A04

Decode Both

W0C4A0C

6.3.3 QR Code

6.3.3.1 Restore Factory Defaults

Restore the Factory Defaults of QR Code

WFFD9B2

6.3.3.2 Enable/Disable QR Code

Enable QR Code

W800D80

Disable QR Code

W800D00

6.3.4 Micro QR

Enable Micro QR

W049904

Disable Micro QR

W049900

6.3.4.1 Mirrored Micro QR

Decode Mirrored Micro QR

W089908

Do Not Decode Mirrored Micro QR

W089900

7.Appendix

7.1 Appendix A: Factory Defaults Table

Parameter		Factory Default	Remark
Programming Barcode			
Barcode Programming		Barcode Programming	Barcode Programming
Programming Barcode Data		Programming Barcode Data	Programming Barcode Data
Communication Interfaces			
TTL-232	Baud Rate	9600	
	Parity Check	None	
	Number of Data Bits	8	
	Number of Stop Bits	1	
	Hardware Flow Control	None	
USB Interface		USB DATAPIPE	Other options: USB HID-KBW, USB COM Port Emulation, HID-POS.
USB HID-KBW	Input Mode	Standard Keyboard	
	USB Country Keyboard Type	U.S.	
	Beep on Unknown Character	Enabled	
	Inter-Keystroke	No delay	

	Delay		
	Caps Lock	Disabled	
	Convert Case	No conversion	
	Emulate Numeric Keypad	Disabled	
Scan Mode			
Scan Mode		Manual mode	Other options: Continuous Mode, Sense Mode, Command Trigger Mode.
Continu-ous Mode	Decode Session Timeout	3.0s	0.1-25.5s; 0: infinite.
	Timeout between Decodes	1.0s	0-25.5s
Sense Mode	Decode Session Timeout	3.0s	0.1-25.5s; 0: infinite.
	Timeout between Decodes	1.0s	0-25.5s
	Image Stabilization Timeout	0.4s	0-25.5s
	Sensitivity	Medium	
Command Trigger	Decode Session Timeout	3.0s	0.1-25.5s; 0: infinite.

Mode			
Illumination & Aiming			
Illumination		Normal	Turn on when scanning barcode
Aiming		Normal	Turn on when scanning barcode
Notification			
Mute Mode		Disabled	
Good Read Beep	Beep on Good Read	Enabled	
	Beep Frequency	Medium	
	Beep Duration	80ms	Other options: 40ms, 120ms.
Good Read LED		Enabled	
Decode Result Notification		Disabled	“S”: Good read; ”F”: No read. NOT applicable to USB DATAPIPE.
Data Formatting			
AIM ID Prefix		Disabled	
Code ID Prefix		Disabled	
Code ID Type		Original Code ID	
Terminating Character Suffix		Disabled	Terminating character

		options:CR, CRLF,TAB.
Symbologies		
Video Reverse	Disabled	Applicable to all symbologies.
Code 128		
Code 128	Enabled	
UCC/EAN-128 (GS1-128)		
UCC/EAN-128	Enabled	
AIM 128		
AIM 128	Enabled	
EAN-8		
EAN-8	Enabled	
Check Digit	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
Extend to EAN-13	Disabled	
EAN-13		
EAN-13	EAN-13	
Check Digit	Check Digit	
2-Digit Add-On Code	2-Digit Add-On Code	
5-Digit Add-On Code	5-Digit Add-On Code	
Add-On Code	Add-On Code	
ISSN		
ISSN	Disabled	

ISBN		
ISBN	Enabled	
ISBN Format	ISBN-13	
UPC-E		
UPC-E	Enabled	
Check Digit	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
Extend to UPC-A	Disabled	
System Character “0”	Do not transmit	
UPC-A		
UPC-A	Enabled	
Check Digit	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
Preamble Character “0”	Do not transmit	
Interleaved 2 of 5		
Interleaved 2 of 5	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Appended “0”	Transmit	For Interleaved 2 of 5 barcodes that contain an odd number of characters
ITF-6		

ITF-6	Disabled	
Check Digit	Do not transmit	
ITF-14		
ITF-14	Enabled	
Check Digit	Transmit	
Matrix 2 of 5		
Matrix 2 of 5	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Industrial 25		
Industrial 25	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Code 39		
Code 39	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Start/Stop Character	Do not transmit	
Code 39 Full ASCII	Disabled	
Codabar		
Codabar	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Start/Stop Character	Transmit	
Start/Stop Character Format	ABCD/ABCD	
Code 93		

Code 93	Enabled	
Check Digit Verification	Enabled	
Check Digit	Do not transmit	
Code 11		
Code 11	Enabled	
Check Digit Verification	One check digit, MOD11	
Check Digit	Transmit	
Plessey		
Plessey	Enabled	
Check Digit Verification	Enabled	
Check Digit	Do not transmit	
MSI-Plessey		
MSI-Plessey	Enabled	
Check Digit Verification	One check digit, MOD10	
Check Digit	Transmit	
RSS-14		
RSS-14	Enabled	
AI (Application Identifier)	Transmit	
RSS-Limited		
RSS-Limited	Enabled	
AI (Application Identifier)	Transmit	
RSS-Expand		
RSS-Expand	Enabled	
PDF417		
PDF417	Enabled	

Data Matrix		
Data Matrix	Enabled	
Rectangular Barcodes	Decode	
Mirror Images	Decode unmirrored DM only	
QR Code		
QR Code	Enabled	
Micro QR	Enabled	
Mirrored Micro QR	Do not decode	

7.2 Appendix B: AIM ID Table

Symbology	AIM ID	Remark
Code 128	]C0	Standard Code 128
UCC/EAN 128 (GS1-128)	]C1	FNC1 is the character right after the start character
AIM 128	]C2	FNC1 is the 2nd character after the start character
EAN-8	]E4	Standard EAN-8
	]E4….]E1…	EAN-8 + 2-Digit Add-On Code
	]E4….]E2…	EAN-8 + 5-Digit Add-On Code
EAN-13	]E0	Standard EAN-13
	]E3	EAN-13 + 2/5-Digit Add-On Code
ISSN	]X5	Standard ISSN
ISBN	]X4	Standard ISBN
UPC-E	]E0	Standard UPC-E

	]E3	UPC-E + 2/5-Digit Add-On Code
UPC-A	]E0	Standard UPC-A
	]E3	UPC-A + 2/5-Digit Add-On Code
Interleaved 2 of 5	]I0	No check digit verification
	]I1	Transmit check digit after verification
	]I3	Do not transmit check digit after verification
ITF-6	]I1	Transmit check digit
	]I3	Do not transmit check digit
ITF-14	]I1	Transmit check digit
	]I3	Do not transmit check digit
Matrix 2 of 5	]X1	No check digit verification
	]X2	Transmit check digit after verification
	]X3	Do not transmit check digit after verification
Industrial 25	]S0	Not specified
Standard 25	]R0	No check digit verification
	]R8	One check digit, MOD 7; do not transmit check digit
	]R9	One check digit, MOD 7; transmit check digit
Code 39	]A0	Transmit barcodes as is; Full ASCII disabled; no check digit verification
	]A1	One check digit, MOD 43; transmit check digit
	]A3	One check digit, MOD 43; do not transmit check digit
	]A4	Full ASCII enabled; no check digit verification
	]A5	Full ASCII enabled; MOD43; transmit check digit
	]A7	Full ASCII enabled; MOD43; do not transmit

		check digit
Codabar	]F0	Standard Codabar
	]F2	Transmit check digit after verification
	]F4	Do not transmit check digit after verification
Code 93	]G0	Not specified
Code 11	]H0	One check digit, MOD11; transmit check digit
	]H1	Two check digits, MOD11/MOD11; transmit check digit
	]H3	Do not transmit check digit after verification
	]H8	Two check digits, MOD11/MOD9; transmit check digit
	]H9	No check digit verification
Plessey	]P0	Not specified
MSI Plessey	]M0	One check digit, MOD10; transmit check digit
	]M1	One check digit, MOD10; do not transmit check digit
	]M7	Two check digits, MOD10 /MOD11; do not transmit check digit
	]M8	Two check digits, MOD10 /MOD11; transmit check digit
	]M9	No check digit verification
RSS-14 RSS-Limited RSS-Expand	]e0	
PDF417	]L0	Comply with 1994 PDF417 specifications
Data Matrix	]d0	ECC 000 - 140

	]d1	ECC 200
	]d2	ECC 200; FNC1 is the 1st or 5th character after the start character
	]d3	ECC 200; FNC1 is the 2nd or 6th character after the start character
	]d4	ECC 200, ECI protocol supported
	]d5	ECC 200; FNC1 is the 1st or 5th character after the start character; ECI supported
	]d6	ECC 200; FNC1 is the 2nd or 6th character after the start character; ECI supported
QR Code	]Q0	QR1 (comply with AIM ISS 97-001 specifications)
	]Q1	QR2 (2005 symbol), ECI protocol not supported
	]Q2	QR2 (2005 symbol), ECI protocol supported
	]Q3	QR2 (2005 symbol), ECI protocol not supported; FNC1 is the character right after the start character
	]Q4	QR2 (2005 symbol), ECI protocol supported; FNC1 is the character right after the start character
	]Q5	QR2 (2005 symbol), ECI protocol not supported; FNC1 is the 2nd character right after the start character
	]Q6	QR2 (2005 symbol), ECI protocol supported; FNC1 is the 2nd character right after the start character

Reference: ISO/IEC 15424:2008 Information technology – Automatic identification and data capture techniques – Data Carrier Identifiers (including Symbology Identifiers)

7.3 Appendix C: Code ID Table

Symbology	Original Code ID	Visible Code ID
Code 128 FNC3	1	A(0x41)
Code 128	2	B(0x42)
UCC/EAN 128	3	C(0x43)
EAN-8	4	D(0x44)
EAN-13	5	E(0x45)
UPC-E	6	F(0x46)
UPC-A	7	G(0x47)
Interleaved 2 of 5	8	H(0x48)
ITF-14	9	I(0x49)
ITF-6	10	J(0x4A)
Code 39	13	M(0x4D)
Codabar	15	O(0x4F)
Standard 25	16	P(0x50)
Code 93	17	Q(0x51)
AIM 128	21	U(0x55)
MSI Plessey	22	V(0x56)
ISBN	23	W(0x57)
Industrial 25	24	X(0x58)
Matrix 2 of 5	25	Y(0x59)
RSS-14	26	Z(0x5A)

RSS Limited	27	[(0x5B)
RSS Expand	28	\(0x5C)
Code 11	29	](0x5D)
Plessey	30	^(0x5E)
ISSN	31	_(0x5F)
PDF417	32	`(0x60)
QR	33	a(0x61)
Data Matrix	35	c(0x63)

7.4 Appendix D: Parameter Programming Examples

The following examples show you how to program parameters by scanning programming barcodes.

7.4.1 Program the Decode Session Timeout

Example: Set the decode session timeout to 5.0s

1. Scan the Decode Session Timeout barcode.
2. Scan the numeric barcodes “5” and “0”.
3. Scan the Save barcode.

7.4.2 Program the Timeout between Decodes

Example: Set the timeout between decodes to 5.0s

1. Scan the Timeout between Decodes barcode.
2. Scan the numeric barcodes “5” and “0”.
3. Scan the Save barcode.

7.4.3 Program the Image Stabilization Timeout

Example: Set the image stabilization timeout to 5.0s

1. Scan the Image Stabilization Timeout barcode.
2. Scan the numeric barcodes “5” and “0”.

3. Scan the Save barcode.

7.4.4 Program the Sensitivity Level

Example: Set the sensitivity level to 5

1. Scan the Custom Sensitivity barcode.
2. Scan the numeric barcode “5”.
3. Scan the Save barcode.

7.5 Appendix E: Digit Barcodes

0～5

0

1

2

3

4

5

6～9

6

7

8

9

A～F

A

B

C

D

E

F

7.6 Appendix F: Save/Cancel Barcodes

After reading numeric barcode(s), you need to scan the Save barcode to save the data. If you scan the wrong digit(s), you can either scan the Cancel the Last Digit barcode and then the correct digit, or scan the Cancel All Digits barcode and then the digits you want.

For instance, after reading the Decode Session Timeout barcode and numeric barcodes “1”, “2” and “3”, you scan:

Cancel the Last Digit: The last digit “3” will be removed.

Cancel All Digits: All digits “123” will be removed.

Save

Cancel the Last Digit

Cancel All Digits