

Chapter 16 Driver's License Set Up (DS6878-DL)

Introduction

The DS6878-DL digital scanner is capable of parsing out information from standard US driver's licenses and certain other American Association of Motor Vehicle Administrators (AAMVA) compliant ID cards. Parsing can be achieved in one of two ways:

- Internally embedded algorithms - scanning bar codes activates algorithms internally embedded in the digital scanner to produce formatted data. Use the formatted data for age verification, credit card application information, and more.
- Server based parsing algorithms - the digital scanner recognizes the same ID cards but encrypts the content and sends this to a host side application. The host side application uses Motorola's server based parsing algorithms, provided as a .DLL, to produce formatted data.

This chapter describes how to program the Symbol DS6878-DL digital scanner to read and use the data contained in the 2D bar codes on US driver's licenses and AAMVA compliant ID cards.

Driver's License Parsing

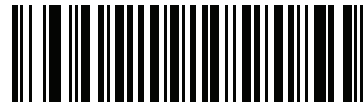
There are three options available for programming the digital scanner:

- No driver's license parsing (default) - disables the feature.
- Embedded driver's license parsing - this does not require Motorola software (.DLL).
Scan the bar codes on the following pages in the order indicating the sequence of data fields that the digital scanner outputs. See *Parsing Driver's License Data Fields (Embedded Driver's License Parsing)* on page 16-3 for more information.
As jurisdictional updates become available, Motorola updates a series of bar codes on the Motorola Web site: <http://www.motorola.com/enterprisemobility/support>.
These bar codes contain embedded software. Scanning these in conjunction with the bar codes on [page 16-4](#) download jurisdictional software updates to the digital scanner. The updates reside in the digital scanner's Flash memory and apply when the digital scanner is next used.
- Server based driver's license parsing - this requires Motorola software (.DLL).
The digital scanner recognizes the same ID cards, encrypts the content, and sends it to a host side application that can use Motorola's *server based* parsing algorithms. Download/install the software from the Motorola Web site at: <http://www.motorola.com/enterprisemobility/support>.
When the Motorola .DLL installs on the host server along with a custom driver's license application, the Symbol DS6878 digital scanner can read 2D bar codes on standard US driver's licenses and AAMVA compliant ID cards to produce formatted data. Use this data for age verification, credit card application information, and more.
The Motorola driver's license Software Developer Kit (SDK), available on the Motorola Web site at <http://www.motorola.com/enterprisemobility/support>, provides scanner software, sample code, a demo application, and Help to develop the application necessary to generate formatted driver's license information.
As jurisdictional updates become available, Motorola updates the .DLL on the Motorola Web site.

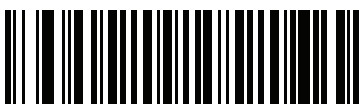
Scan the appropriate bar code below to program the digital scanner.



***No Driver's License Parsing**



Embedded Driver's License Parsing



Server Based Driver's License Parsing

Parsing Driver's License Data Fields (Embedded Driver's License Parsing)

To begin programming a parsing rule:

1. Scan *Begin New Driver's License Parse Rule on page 16-4*.
2. Scan any of the field bar codes on the following pages, or **Send Keystroke (Control Characters and Keyboard Characters) on page 16-24** to complete the parsing rule.
3. After entering the entire rule, scan *Save Driver's License Parse Rule on page 16-4* to save the rule.

✓ **NOTE** Only ONE driver's license parsing rule may be stored in memory at any time. Saving a new rule replaces the prior rule.

To abort the programming sequence at any time during programming, scan *Quit Entering Driver's License Rule on page 16-4*. Any previously saved rule is retained.

To erase a programmed saved rule, scan *Erase Driver's License Parse Rules on page 16-4*.

Embedded Driver's License Parsing Criteria - Code Type

After specifying the fields and their order for the parsed driver's license, you can also apply standard ADF rules to the parsed data using the **Parsed Driver's License** criterion bar code in the *Advanced Data Formatting Programmer Guide*.

✓ **NOTE** Only create standard ADF rules on parsed driver's license data when configured for Embedded Driver's License Parsing.

See *Embedded Driver's License Parsing ADF Example on page 16-21* for a sample ADF rule using this code type criterion.

Driver's License Parse Field Bar Codes



Begin New Driver's License Parse Rule



Save Driver's License Parse Rule



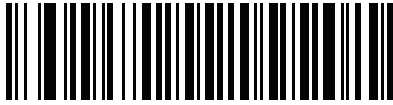
Quit Entering Driver's License Rule



Erase Driver's License Parse Rules

Driver's License Parse Field Bar Codes (continued)

The parse fields currently supported begin below. Not all IDs present data in the same format. For example, some IDs may have separate fields for first name, last name, and middle initial, and others may have a single field with the entire name. In addition, some IDs may expire on the subject's birth date and the actual expiration date field may only indicate the year. In order to present data in a consistent format, the following nine bar codes return data that may be calculated from the actual data contained within the ID bar code.



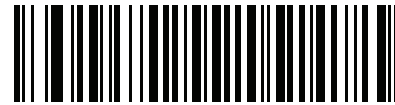
First Name



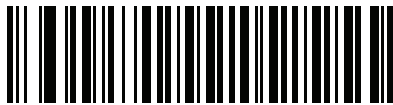
Middle Name/Initial



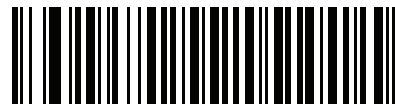
Last Name



Name Suffix



Name Prefix



Expiration Date

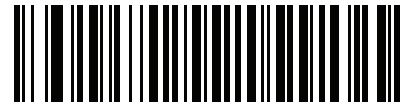


Birth Date

Driver's License Parse Field Bar Codes (continued)

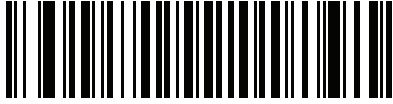


Issue Date

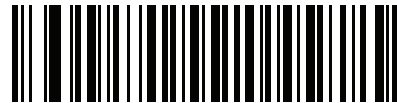


ID Number (Formatted)

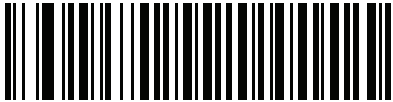
AAMVA Parse Field Bar Codes



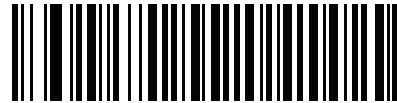
AAMVA Issuer ID



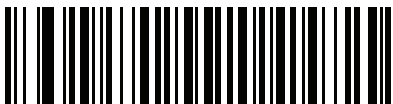
Full Name



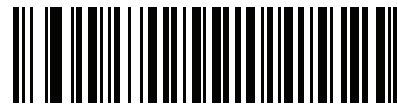
Last Name



First Name



Middle Name / Initial



Name Suffix

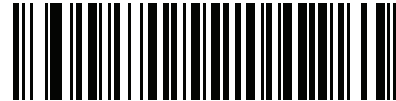


Name Prefix

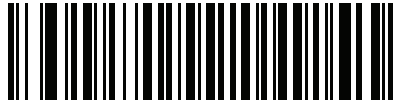
AAMVA Parse Field Bar Codes (continued)



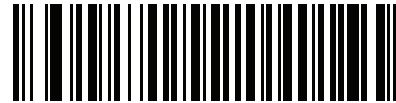
Mailing Address Line 1



Mailing Address Line 2



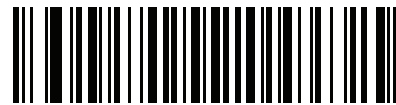
Mailing Address City



Mailing Address State



Mailing Address Postal Code



Home Address Line 1

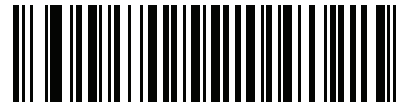


Home Address Line 2

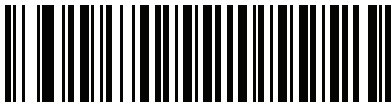
AAMVA Parse Field Bar Codes (continued)



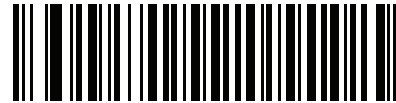
Home Address City



Home Address State



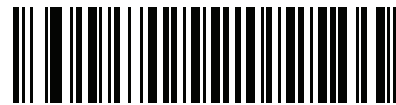
Home Address Postal Code



License ID Number



License Class



License Restrictions

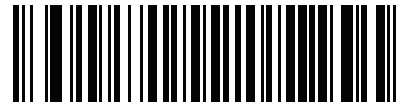


License Endorsements

AAMVA Parse Field Bar Codes (continued)



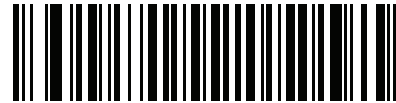
Height (Feet and/or Inches)



Height (Centimeters)



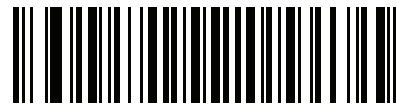
Weight (Pounds)



Weight (Kilograms)



Eye Color



Hair Color

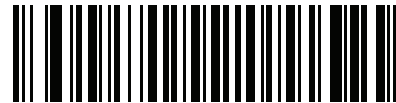


License Expiration Date

AAMVA Parse Field Bar Codes (continued)



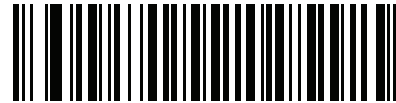
Birth Date



Gender



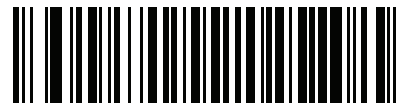
License Issue Date



Social Security Number



Permit Class



Permit Expiration Date

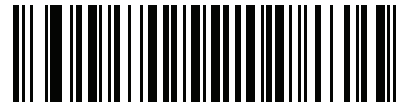


Permit ID Number

AAMVA Parse Field Bar Codes (continued)



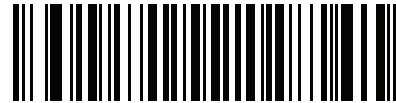
Permit Issue Date



Permit Restrictions



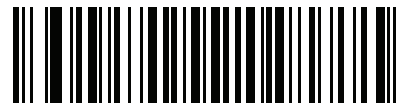
Permit Endorsements



AKA Social Security Name



AKA Full Name



AKA Last Name

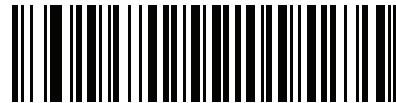


AKA First Name

AAMVA Parse Field Bar Codes (continued)



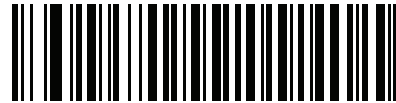
AKA Middle Name / Initial



AKA Name Suffix



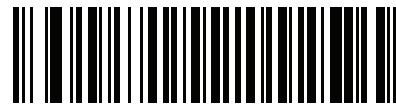
AKA Name Prefix



AKA Birth Date



Issue Timestamp



Number of Duplicates

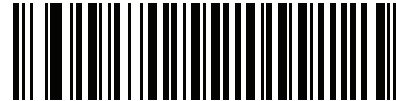


Medical Codes

AAMVA Parse Field Bar Codes (continued)



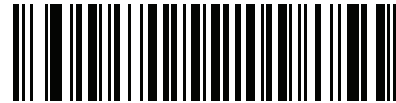
Organ Donor



Nonresident



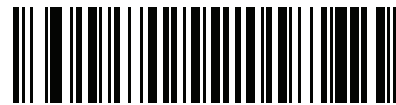
Customer ID



Weight Range



Document Discriminator



Country

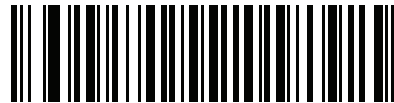


Federal Commission Codes

AAMVA Parse Field Bar Codes (continued)



Place of Birth



Audit Information



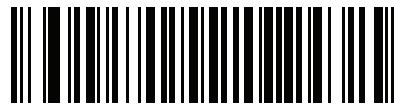
Inventory Control



Race / Ethnicity



Std Vehicle Class



Std Endorsements

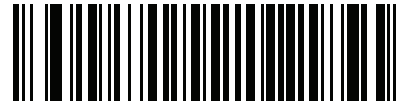


Std Restrictions

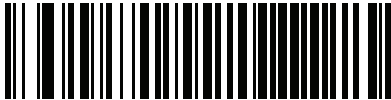
AAMVA Parse Field Bar Codes (continued)



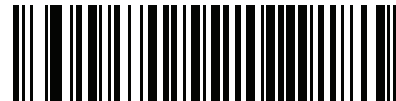
Class Description



Endorsement Description



Restrictions Description



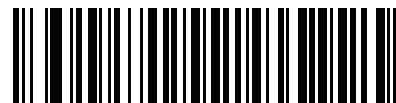
Height in Inches



Height in Centimeters

Parser Version ID Bar Codes

Include this field to emit embedded parser software version identification



Parser Version ID

Parsing Rule Example

Scan the following bar codes in sequence to program the digital scanner to extract and transmit first, middle, and last names; mailing address line 1; mailing address line 2; mailing address city; mailing address state; mailing address postal code; and, date of birth. Then, scan a driver's license bar code.

✓ **NOTE** This example applies to RS-232. To use this example with a USB interface, scan *Function Key Mapping* on page 6-9 in place of the **Send Control M (Carriage Return)** bar codes.

1



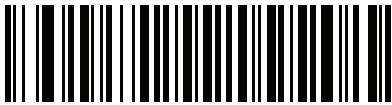
Embedded Driver's License Parsing

2



Begin New Driver's License Parse Rule

3



First Name

4



Send Space

5



Middle Name / Initial

6



Send Space

Parsing Rule Example (continued)

7



Last Name

8



Send Enter Key

9



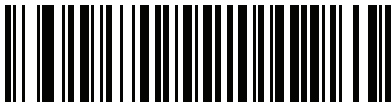
Mailing Address Line 1

10



Send Space

11



Mailing Address Line 2

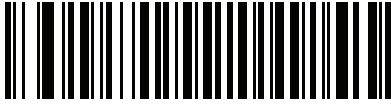
12



Send Enter Key

Parsing Rule Example (continued)

13



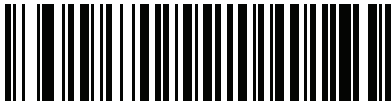
Mailing Address City

14



Send Space

15



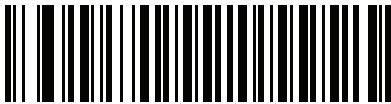
Mailing Address State

16



Send Space

17



Mailing Address Postal Code

Parsing Rule Example (continued)

18



Send Enter Key

19



Birth Date

20



Send Enter Key

21



Save Driver's Licence Parse Rule

Embedded Driver's License Parsing ADF Example

This example creates a parsing rule for parsed data configured to result in the format:

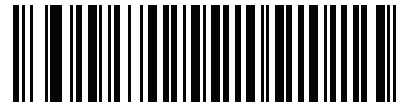
Last Name, First Name

1



Begin New Driver's License Parse Rule

2



Last Name

3



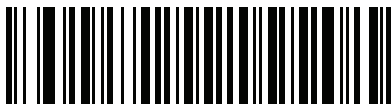
Send ,

4



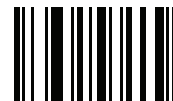
Send Space

5



First Name

6



Save Driver's Licence Parse Rule

Then, in order to limit the full name to 15 characters, create the following ADF rule:

1



Begin New Rule

2



Criterion: Parsed Driver's License

3



Action: Send Next 15 Characters

4



Save Rule

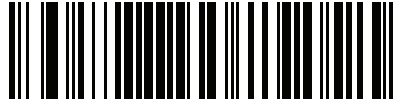
For a license belonging to Michael Williams, the parsed data is Williams, Michael and Williams, Micha after applying the previous ADF rule.

Field Update Procedure

Scan the following bar codes in order to perform a field update.

This update COMPLETELY REPLACES prior updates and overrides any embedded parsing software programmed in the digital scanner.

1. Scan **Field Update Start**.



Field Update Start

2. Scan the entire set of PDF bar codes provided separately.

3. Scan **Field Update End**.



Field Update End

Scan **Erase all Field Updates** to completely remove all previous updates. It is not necessary to scan this bar code before performing a normal field update. Scanning this bar code ensures that only the parsing software currently in the digital scanner is used for parsing.

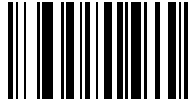


Erase all Field Updates

User Preferences

Set Default Parameter

Scan this bar code to return all parameters to the default values listed in [Table A-1 on page A-1](#).



*Set All Defaults

Send Keystroke (Control Characters and Keyboard Characters)

Control Characters

Scan a **Send** bar code for the keystroke to send.



Send Control A



Send Control B

Control Characters (continued)



Send Control C



Send Control D



Send Control E



Send Control F



Send Control G



Send Control H



Send Control I

Control Characters (continued)



Send Control J



Send Control K



Send Control L



Send Control M



Send Control N



Send Control O



Send Control P

Control Characters (continued)



Send Control Q



Send Control R



Send Control S



Send Control T



Send Control U



Send Control V



Send Control W

Control Characters (continued)



Send Control X



Send Control Y



Send Control Z



Send Control [



**Send Control **



Send Control]

Control Characters (continued)



Send Control 6



Send Control -

Keyboard Characters

Scan a **Send** bar code for the keyboard characters to send.



Send Space



Send !



Keyboard Characters (continued)



Send \$



Send %



Send &



Send '



Send (



Send)



Send *

Keyboard Characters (continued)



Send +



Send ,



Send -



Send .



Send /



Send 0



Send 1

Keyboard Characters (continued)



Send 2



Send 3



Send 4



Send 5



Send 6



Send 7



Send 8

Keyboard Characters (continued)



Send 9



Send :



Send ;



Send <



Send =



Send >



Send ?

Keyboard Characters (continued)



Send @



Send A



Send B



Send C



Send D



Send E



Send F

Keyboard Characters (continued)



Send G



Send H



Send I



Send J



Send K



Send L



Send M

Keyboard Characters (continued)



Send N



Send O



Send P



Send Q



Send R



Send S



Send T

Keyboard Characters (continued)



Send U



Send V



Send W



Send X



Send Y



Send Z



Send [

Keyboard Characters (continued)



Send \



Send]



Send ^



Send _



Send `



Send a



Send b

Keyboard Characters (continued)



Send c



Send d



Send e



Send f



Send g



Send h



Send i

Keyboard Characters (continued)



Send j



Send k



Send l



Send m



Send n



Send o



Send p

Keyboard Characters (continued)



Send q



Send r



Send s



Send t



Send u



Send v



Send w

Keyboard Characters (continued)



Send x



Send y



Send z



Send {



Send |



Send }



Send ~

Keyboard Characters (continued)



Send Tab Key



Send Enter Key

Appendix A Standard Default Parameters

Table A-1 Standard Default Parameters Table

Parameter	Default	Page Number
Radio Communications		
Bluetooth Host (Host Type)	Cradle Host	4-5
Discoverable Mode	General	4-7
Country Keyboard Types (Country Code)	North American	4-8
HID Keyboard Keystroke Delay	No Delay (0 msec)	4-10
CAPS Lock Override	Disable	4-10
Ignore Unknown Characters	Enable	4-11
Emulate Keypad	Disable	4-11
Keyboard FN1 Substitution	Disable	4-12
Function Key Mapping	Disable	4-12
Simulated Caps Lock	Disable	4-13
Convert Case	No Case Conversion	4-13
Beep on Reconnect Attempt	Disable	4-15
Reconnect Attempt Interval	30 sec	4-15
Auto-reconnect in Bluetooth Keyboard Emulation (HID Slave) Mode	On Bar Code Data	4-17
Modes of Operation (Point-to-Point/Multipoint-to-Point)	Point-to-Point	4-18
Parameter Broadcast (Cradle Host Only)	Enable	4-19

¹User selection is required to configure this interface and this is the most common selection.

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
Pairing Modes	Unlocked	4-20
Pairing on Contacts	Enable	4-21
Connection Maintenance Interval	15 min	4-24
Authentication	Disable	4-25
Variable Pin Code	Static	4-26
Encryption	Disable	4-27
User Preferences		
Set Default Parameter	Set Defaults	5-4
Parameter Bar Code Scanning	Enable	5-5
Beep After Good Decode	Enable	5-5
Suppress Power Up Beeps	Do Not Suppress	5-6
Beeper Tone	Medium	5-7
Beeper Volume	High	5-8
Beeper Duration	Medium	5-9
Beep on Insertion	Enabled	5-9
Batch Mode	Normal (Do Not Batch Data)	5-10
Low Power Mode	Enabled	5-12
Time Delay to Reduced Power Mode	1 Sec	5-13
Timeout to Low Power Mode from Auto Aim	15 Sec	5-14
Hand-Held Trigger Mode	Level	5-15
Picklist Mode	Disabled Always	5-16
Mobile Phone/Display Mode	Disable	5-17
Continuous Bar Code Read	Disable	5-18
Decode Session Timeout	9.9 Sec	5-19
Timeout Between Decodes, Same Symbol	0.5 Sec	5-20
Timeout Between Decodes, Different Symbols	0.2 Sec	5-20
Fuzzy 1D Processing	Enable	5-21
Hand-Held Decode Aiming Pattern	Enable	5-22

¹User selection is required to configure this interface and this is the most common selection.

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
Decoding Illumination	Enable	5-23
Multicode Mode	Disable	5-23
Multicode Expression	1	5-24
Multicode Mode Concatenation	Disable	5-29
Multicode Concatenation Symbology	Concatenate as PDF417	5-30
Miscellaneous Options		
Transmit Code ID Character	None	5-33
Prefix Value	7013 <CR><LF>	5-34
Suffix 1 Value Suffix 2 Value	7013 <CR><LF>	5-34
Scan Data Transmission Format	Data as is	5-35
FN1 Substitution Values	Set	5-36
Transmit "No Read" Message	Disable	5-37
USB Host Parameters		
USB Device Type	HID Keyboard Emulation	6-4
USB Country Keyboard Types (Country Codes)	North American	6-5
USB Keystroke Delay	No Delay	6-7
USB CAPS Lock Override	Disable	6-7
USB Ignore Unknown Characters	Send	6-8
Emulate Keypad	Disable	6-8
USB FN1 Substitution	Disable	6-9
Function Key Mapping	Disable	6-9
Simulated Caps Lock	Disable	6-10
Convert Case	No Case Conversion	6-10
Ignore Beep	Disable	6-11
Ignore Bar Code Configuration	Disable	6-11
RS-232 Host Parameters		
RS-232 Host Types	Standard	7-6

¹User selection is required to configure this interface and this is the most common selection.

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
Baud Rate	9600	7-8
Parity Type	None	7-9
Stop Bit Select	1 Stop Bit	7-9
Data Bits (ASCII Format)	8-Bit	7-10
Check Receive Errors	Enable	7-11
Hardware Handshaking	None	7-11
Software Handshaking	None	7-13
Host Serial Response Time-out	2 sec	7-15
RTS Line State	Low RTS	7-16
Beep on <BEL>	Disable	7-16
Intercharacter Delay	0 msec	7-17
Nixdorf Beep/LED Options	Normal Operation	7-18
Ignore Unknown Characters	Send Bar Code	7-18
Keyboard Wedge Host Parameters		
Keyboard Wedge Host Type	IBM PC/AT& IBM PC Compatibles ¹	8-4
Country Types (Country Codes)	North American	8-5
Ignore Unknown Characters	Send	8-6
Keystroke Delay	No Delay	8-7
Intra-Keystroke Delay	Disable	8-7
Alternate Numeric Keypad Emulation	Disable	8-8
Caps Lock On	Disable	8-8
Caps Lock Override	Disable	8-9
Convert Wedge Data	No Convert	8-9
Function Key Mapping	Disable	8-10
FN1 Substitution	Disable	8-10
Send and Make Break	Send	8-11
IBM 468X/469X Host Parameters		

¹User selection is required to configure this interface and this is the most common selection.

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
Port Address	None Selected	9-4
Convert Unknown to Code 39	Disable	9-5
Ignore Beep	Disable	9-5
Ignore Bar Code Configuration	Disable	9-6
Wand Emulation Host Parameters		
Wand Emulation Host Types	Symbol OmniLink Interface Controller ¹	10-4
Leading Margin	80 msec	10-5
Polarity	Bar High/Margin Low	10-6
Ignore Unknown Characters	Send	10-6
Convert All Bar Codes to Code 39	Disable	10-7
Convert Code 39 to Full ASCII	Disable	10-8
Scanner Emulation		
Beep Style	Beep on Successful Transmit	11-4
Parameter Pass-Through	Parameter Process and Pass Through	11-5
Convert Newer Code Types	Convert Newer Code Types	11-6
Module Width	20 µs	11-6
Convert All Bar Codes to Code 39	Do Not Convert Bar Codes to Code 39	11-7
Code 39 Full ASCII Conversion	Disable	11-7
Transmission Timeout	3 sec	11-8
Ignore Unknown Characters	Ignore Unknown Characters	11-9
Leading Margin	2 ms	11-9
Check for Decode LED	Check for Decode LED	11-10
123Scan² Configuration Tool		
123Scan ² Configuration	None ¹	12-1
OCR Programming Parameters		
OCR-A	Disable	13-3

¹User selection is required to configure this interface and this is the most common selection.

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
OCR-A Variant	Full ASCII	13-3
OCR-B	Disable	13-5
OCR-B Variant	Full ASCII	13-6
MICR E13B	Disable	13-9
US Currency	Disable	13-10
OCR Orientation	0°	13-10
OCR Lines	1	13-12
OCR Minimum Characters	3	13-12
OCR Maximum Characters	100	13-13
OCR Security Level	80	13-13
OCR Subset	Selected font variant	13-14
OCR Quiet Zone	50	13-14
OCR Bright Illumination	Disable	13-15
OCR Template	54R	13-16
OCR Check Digit Modulus	1	13-25
OCR Check Digit Multiplier	121212121212	13-26
OCR Check Digit Validation	None	13-27
UPC/EAN		
UPC-A	Enable	14-7
UPC-E	Enable	14-7
UPC-E1	Disable	14-8
EAN-8/JAN 8	Enable	14-8
EAN-13/JAN 13	Enable	14-9
Bookland EAN	Disable	14-9
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	Ignore	14-10
User-Programmable Supplementals		14-13
Decode UPC/EAN/JAN Supplemental Redundancy	7	14-13
Transmit UPC-A Check Digit	Enable	14-14

¹User selection is required to configure this interface and this is the most common selection.

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
Transmit UPC-E Check Digit	Enable	14-15
Transmit UPC-E1 Check Digit	Enable	14-15
UPC-A Preamble	System Character	14-16
UPC-E Preamble	System Character	14-17
UPC-E1 Preamble	System Character	14-18
Convert UPC-E to A	Disable	14-19
Convert UPC-E1 to A	Disable	14-19
EAN-8/JAN-8 Extend	Disable	14-20
Bookland ISBN Format	ISBN-10	14-21
UCC Coupon Extended Code	Disable	14-22
ISSN EAN	Disable	14-22
Code 128		
Code 128	Enable	14-23
Set Length(s) for Code 128	Any Length	14-24
GS1-128 (formerly UCC/EAN-128)	Enable	14-24
ISBT 128	Enable	14-25
ISBT Concatenation	Disable	14-26
Check ISBT Table	Enable	14-27
ISBT Concatenation Redundancy	10	14-27
Code 39		
Code 39	Enable	14-28
Trioptic Code 39	Disable	14-28
Convert Code 39 to Code 32 (Italian Pharmacy Code)	Disable	14-29
Code 32 Prefix	Disable	14-29
Set Length(s) for Code 39	2 to 55	14-30
Code 39 Check Digit Verification	Disable	14-31
Transmit Code 39 Check Digit	Disable	14-31
Code 39 Full ASCII Conversion	Disable	14-32

¹User selection is required to configure this interface and this is the most common selection.

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
Buffer Code 39	Disable	14-32
Code 93		
Code 93	Disable	14-35
Set Length(s) for Code 93	4 to 55	14-35
Code 11		
Code 11	Disable	14-37
Set Lengths for Code 11	4 to 55	14-37
Code 11 Check Digit Verification	Disable	14-39
Transmit Code 11 Check Digit(s)	Disable	14-40
Interleaved 2 of 5 (ITF)		
Interleaved 2 of 5 (ITF)	Enable	14-40
Set Lengths for I 2 of 5	14	14-41
I 2 of 5 Check Digit Verification	Disable	14-43
Transmit I 2 of 5 Check Digit	Disable	14-43
Convert I 2 of 5 to EAN 13	Disable	14-44
Discrete 2 of 5 (DTF)		
Discrete 2 of 5	Disable	14-44
Set Length(s) for D 2 of 5	12	14-45
Codabar (NW - 7)		
Codabar	Disable	14-47
Set Lengths for Codabar	5 to 55	14-47
CLSI Editing	Disable	14-49
NOTIS Editing	Disable	14-49
MSI		
MSI	Disable	14-50
Set Length(s) for MSI	2 to 55	14-50
MSI Check Digits	One	14-52
Transmit MSI Check Digit	Disable	14-52

¹User selection is required to configure this interface and this is the most common selection.

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
MSI Check Digit Algorithm	Mod 10/Mod 10	14-53
Chinese 2 of 5		
Enable/Disable Chinese 2 of 5	Disable	14-53
Matrix 2 of 5		
Enable/Disable Matrix 2 of 5	Disable	14-54
Matrix 2 of 5 Lengths	1 Length - 14	14-55
Matrix 2 of 5 Redundancy	Disable	14-56
Matrix 2 of 5 Check Digit	Disable	14-56
Transmit Matrix 2 of 5 Check Digit	Disable	14-57
Korean 3 of 5		
Korean 3 of 5		14-57
Inverse 1D		
Inverse 1D	Regular	14-58
Postal Codes		
US Postnet	Disable	14-59
US Planet	Disable	14-59
Transmit US Postal Check Digit	Enable	14-60
UK Postal	Disable	14-60
Transmit UK Postal Check Digit	Enable	14-61
Japan Postal	Disable	14-61
Australian Postal	Disable	14-62
Netherlands KIX Code	Disable	14-62
USPS 4CB/One Code/Intelligent Mail	Disable	14-63
UPU FICS Postal	Disable	14-63
GS1 DataBar		
GS1 DataBar-14	Disable	14-64
GS1 DataBar Limited	Disable	14-64
GS1 DataBar Expanded	Disable	14-65

¹User selection is required to configure this interface and this is the most common selection.

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
Convert GS1 DataBar to UPC/EAN	Disable	14-65
Composite		
Composite CC-C	Disable	14-66
Composite CC-A/B	Disable	14-66
Composite TLC-39	Disable	14-67
UPC Composite Mode	Never Linked	14-67
Composite Beep Mode	Beep As Each Code Type is Decoded	14-68
GS1-128 Emulation Mode for UCC/EAN Composite Codes	Disable	14-68
2D Symbologies		
PDF417	Enable	14-69
MicroPDF417	Disable	14-69
Code 128 Emulation	Disable	14-70
Data Matrix	Enable	14-71
Data Matrix Inverse	Regular	14-71
Maxicode	Disable	14-72
QR Code	Enable	14-72
QR Inverse	Regular	14-73
MicroQR	Enable	14-73
Aztec	Enable	14-74
Aztec Inverse	Regular	14-74
Symbology-Specific Security Levels		
Redundancy Level	1	14-75
Security Level	0	14-77
Intercharacter Gap Size	Normal	14-78
Report Version		14-78
¹User selection is required to configure this interface and this is the most common selection.		

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Default	Page Number
Micro PDF		
Flush Macro PDF Buffer	1	14-79
Abort Macro PDF Entry		14-79
¹User selection is required to configure this interface and this is the most common selection.		

Appendix B Programming Reference

Symbol Code Identifiers

Table B-1 *Symbol Code Characters*

Code Character	Code Type
A	UPC-A, UPC-E, UPC-E1, EAN-8, EAN-13
B	Code 39, Code 32
C	Codabar
D	Code 128, ISBT 128, ISBT 128 Concatenated
E	Code 93
F	Interleaved 2 of 5
G	Discrete 2 of 5, or Discrete 2 of 5 IATA
H	Code 11
J	MSI
K	GS1-128
L	Bookland EAN
M	Trioptic Code 39
N	Coupon Code
R	GS1 DataBar Family
S	Matrix 2 of 5
T	UCC Composite, TLC 39
U	Chinese 2 of 5

Table B-1 *Symbol Code Characters (Continued)*

Code Character	Code Type
V	Korean 3 of 5
X	ISSN EAN, PDF417, Macro PDF417, Micro PDF417
z	Aztec, Aztec Rune
P00	Data Matrix
P01	QR Code, MicroQR
P02	Maxicode
P03	US Postnet
P04	US Planet
P05	Japan Postal
P06	UK Postal
P08	Netherlands KIX Code
P09	Australian Postal
P0A	USPS 4CB/One Code/Intelligent Mail
P0B	UPU FICS Postal
P0X	Signature Capture

AIM Code Identifiers

Each AIM Code Identifier contains the three-character string **Jcm** where:

- J = Flag Character (ASCII 93)
- c = Code Character (see [Table B-2](#))
- m = Modifier Character (see [Table B-3](#))

Table B-2 *Aim Code Characters*

Code Character	Code Type
A	Code 39, Code 39 Full ASCII, Code 32
C	Code 128, ISBT 128, ISBT 128 Concatenated, GS1-128, Coupon (Code 128 portion)
d	Data Matrix
E	UPC/EAN, Coupon (UPC portion)
e	GS1 DataBar Family
F	Codabar
G	Code 93
H	Code 11
I	Interleaved 2 of 5
L	PDF417, Macro PDF417, Micro PDF417
L2	TLC 39
M	MSI
Q	QR Code, MicroQR
S	Discrete 2 of 5, IATA 2 of 5
U	Maxicode
z	Aztec, Aztec Rune
X	Bookland EAN, ISSN EAN, Trioptic Code 39, Chinese 2 of 5, Matrix 2 of 5, Korean 3 of 5, US Postnet, US Planet, UK Postal, Japan Postal, Australian Postal, Netherlands KIX Code, USPS 4CB/One Code/Intelligent Mail, UPU FICS Postal, Signature Capture

The modifier character is the sum of the applicable option values based on [Table B-3](#).

Table B-3 *Modifier Characters*

Code Type	Option Value	Option
Code 39	0	No check character or Full ASCII processing.
	1	Reader has checked one check character.
	3	Reader has checked and stripped check character.
	4	Reader has performed Full ASCII character conversion.
	5	Reader has performed Full ASCII character conversion and checked one check character.
	7	Reader has performed Full ASCII character conversion and checked and stripped check character.
	Example: A Full ASCII bar code with check character W, A+I+MI+DW , is transmitted as J A7AIMID where 7 = (3+4).	
Trioptic Code 39	0	No option specified at this time. Always transmit 0.
	Example: A Trioptic bar code 412356 is transmitted as J X0412356	
Code 128	0	Standard data packet, no Function code 1 in first symbol position.
	1	Function code 1 in first symbol character position.
	2	Function code 1 in second symbol character position.
	Example: A Code (EAN) 128 bar code with Function 1 character ^{FNC1} in the first position, AIMID is transmitted as J C1AIMID	
I 2 of 5	0	No check digit processing.
	1	Reader has validated check digit.
	3	Reader has validated and stripped check digit.
	Example: An I 2 of 5 bar code without check digit, 4123, is transmitted as J I04123	
Codabar	0	No check digit processing.
	1	Reader has checked check digit.
	3	Reader has stripped check digit before transmission.
	Example: A Codabar bar code without check digit, 4123, is transmitted as J F04123	
Code 93	0	No options specified at this time. Always transmit 0.
	Example: A Code 93 bar code 012345678905 is transmitted as J G0012345678905	
MSI	0	Check digits are sent.
	1	No check digit is sent.
	Example: An MSI bar code 4123, with a single check digit checked, is transmitted as J M14123	

Table B-3 *Modifier Characters (Continued)*

Code Type	Option Value	Option
D 2 of 5	0	No options specified at this time. Always transmit 0.
	Example: A D 2 of 5 bar code 4123, is transmitted as JS04123	
UPC/EAN	0	Standard data packet in full EAN format, i.e. 13 digits for UPC-A, UPC-E, and EAN-13 (not including supplemental data).
	1	Two digit supplemental data only.
	2	Five digit supplemental data only.
	3	Combined data packet comprising 13 digits from EAN-13, UPC-A or UPC-E symbol and 2 or 5 digits from supplemental symbol.
	4	EAN-8 data packet.
Example: A UPC-A bar code 012345678905 is transmitted as JE00012345678905		
Bookland EAN	0	No options specified at this time. Always transmit 0.
	Example: A Bookland EAN bar code 123456789X is transmitted as JX0123456789X	
ISSN EAN	0	No options specified at this time. Always transmit 0.
	Example: An ISSN EAN bar code 123456789X is transmitted as JX0123456789X	
Code 11	0	Single check digit
	1	Two check digits
	3	Check characters validated but not transmitted.
GS1 DataBar Family		No option specified at this time. Always transmit 0. GS1 DataBar-14 and GS1 DataBar Limited transmit with an Application Identifier "01". Note: In GS1-128 emulation mode, GS1 DataBar is transmitted using Code 128 rules (i.e., JC1).
	Example: A GS1 DataBar-14 bar code 0110012345678902 is transmitted as Je00110012345678902 .	

Table B-3 Modifier Characters (Continued)

Code Type	Option Value	Option
EAN.UCC Composites (GS1 DataBar, GS1-128, 2D portion of UPC composite)		Native mode transmission. Note: UPC portion of composite is transmitted using UPC rules.
	0	Standard data packet.
	1	Data packet containing the data following an encoded symbol separator character.
	2	Data packet containing the data following an escape mechanism character. The data packet does not support the ECI protocol.
	3	Data packet containing the data following an escape mechanism character. The data packet supports the ECI protocol.
		GS1-128 emulation Note: UPC portion of composite is transmitted using UPC rules.
	1	Data packet is a GS1-128 symbol (i.e., data is preceded with]JC1).
PDF417, Micro PDF417	0	Reader set to conform to protocol defined in 1994 PDF417 symbology specifications. Note: When this option is transmitted, the receiver cannot reliably determine whether ECIs have been invoked or whether data byte 92 _{DEC} has been doubled in transmission.
	1	Reader set to follow the ECI protocol (Extended Channel Interpretation). All data characters 92 _{DEC} are doubled.
	2	Reader set for Basic Channel operation (no escape character transmission protocol). Data characters 92 _{DEC} are not doubled. Note: When decoders are set to this mode, unbuffered Macro symbols and symbols requiring the decoder to convey ECI escape sequences cannot be transmitted.
	3	The bar code contains a GS1-128 symbol, and the first codeword is 903-907, 912, 914, 915.
	4	The bar code contains a GS1-128 symbol, and the first codeword is in the range 908-909.
	5	The bar code contains a GS1-128 symbol, and the first codeword is in the range 910-911.
	Example: A PDF417 bar code ABCD, with no transmission protocol enabled, is transmitted as]L2ABCD.	

Table B-3 *Modifier Characters (Continued)*

Code Type	Option Value	Option
Data Matrix	0	ECC 000-140, not supported.
	1	ECC 200.
	2	ECC 200, FNC1 in first or fifth position.
	3	ECC 200, FNC1 in second or sixth position.
	4	ECC 200, ECI protocol implemented.
	5	ECC 200, FNC1 in first or fifth position, ECI protocol implemented.
	6	ECC 200, FNC1 in second or sixth position, ECI protocol implemented.
MaxiCode	0	Symbol in Mode 4 or 5.
	1	Symbol in Mode 2 or 3.
	2	Symbol in Mode 4 or 5, ECI protocol implemented.
	3	Symbol in Mode 2 or 3, ECI protocol implemented in secondary message.
QR Code	0	Model 1 symbol.
	1	Model 2 / MicroQR symbol, ECI protocol not implemented.
	2	Model 2 symbol, ECI protocol implemented.
	3	Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position.
	4	Model 2 symbol, ECI protocol implemented, FNC1 implied in first position.
	5	Model 2 symbol, ECI protocol not implemented, FNC1 implied in second position.
	6	Model 2 symbol, ECI protocol implemented, FNC1 implied in second position.
Aztec	0	Aztec symbol.
	C	Aztec Rune symbol.

Appendix C Sample Bar Codes

Code 39



UPC/EAN

UPC-A, 100%



EAN-13, 100%



Code 128



Interleaved 2 of 5



GS1 DataBar

✓ **NOTE** GS1 DataBar variants must be enabled to read the bar codes below (see *GS1 DataBar* on page 14-64).



10293847560192837465019283746029478450366523
(GS1 DataBar Expanded Stacked)



1234890hjio9900mnb
(GS1 DataBar Expanded)



08672345650916
(GS1 DataBar Limited)

GS1 DataBar-14



55432198673467
(GS1 DataBar-14 Truncated)

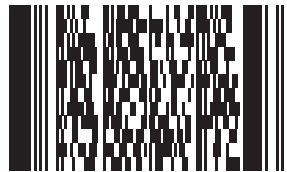


90876523412674
(GS1 DataBar-14 Stacked)



78123465709811
(GS1 DataBar-14 Stacked Omni-Directional)

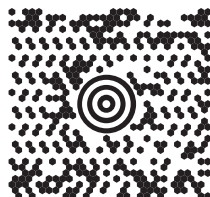
PDF417



Data Matrix



Maxicode



QR Code



US Postnet



UK Postal





Appendix D Numeric Bar Codes

Numeric Bar Codes

For parameters requiring specific numeric values, scan the appropriately numbered bar code(s).



0



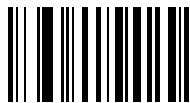
1



2



3



4



5



6



7



8



9

Cancel

To correct an error or change a selection, scan the bar code below.



Cancel

Appendix E Alphanumeric Bar Codes

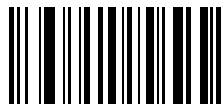
Alphanumeric Keyboard



Space



#



\$



%

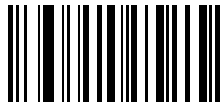
Alphanumeric Keyboard (continued)



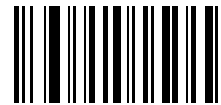
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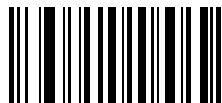


/



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Alphanumeric Keyboard (continued)



“



&



’



(



)

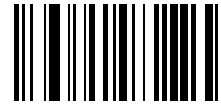


:

Alphanumeric Keyboard (continued)



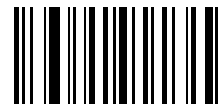
;



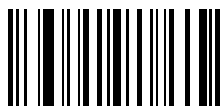
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Alphanumeric Keyboard (continued)



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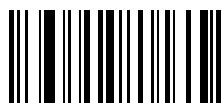
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Alphanumeric Keyboard (continued)

✓ **NOTE** The bar codes that follow should not be confused with those on the numeric keypad.



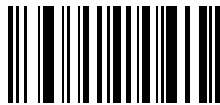
0



1



2



3

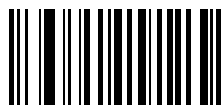


4



5

Alphanumeric Keyboard (continued)



6



7



8



9



End of Message



Cancel

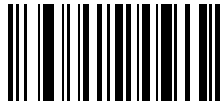
Alphanumeric Keyboard (continued)



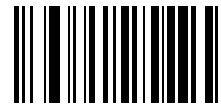
A



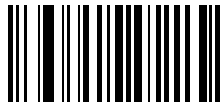
B



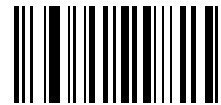
C



D

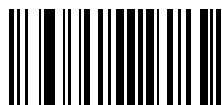


E



F

Alphanumeric Keyboard (continued)



G



H



I



J



K



L

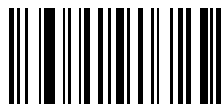
Alphanumeric Keyboard (continued)



M



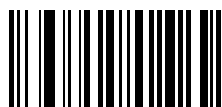
N



O



P



Q



R

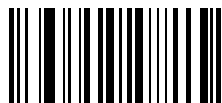
Alphanumeric Keyboard (continued)



S



T



U



V



W

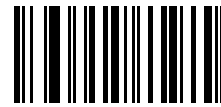


X

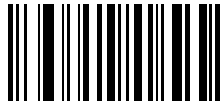
Alphanumeric Keyboard (continued)



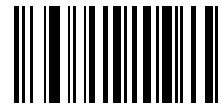
Y



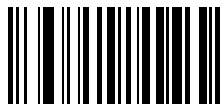
Z



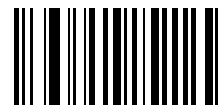
a



b

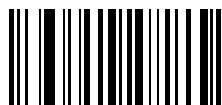


c



d

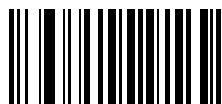
Alphanumeric Keyboard (continued)



e



f



g



h



i

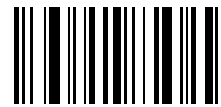


j

Alphanumeric Keyboard (continued)



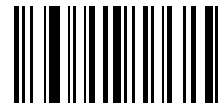
k



l



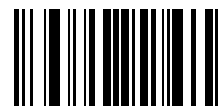
m



n



o



p

Alphanumeric Keyboard (continued)



q



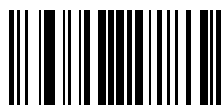
r



s



t

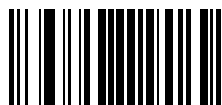


u



v

Alphanumeric Keyboard (continued)



w



x



y



z



{



|

Alphanumeric Keyboard (continued)



}



~

Appendix F ASCII Character Sets

Table F-1 ASCII Value Standard Default Parameters Table

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
1000	%U	CTRL 2
1001	\$A	CTRL A
1002	\$B	CTRL B
1003	\$C	CTRL C
1004	\$D	CTRL D
1005	\$E	CTRL E
1006	\$F	CTRL F
1007	\$G	CTRL G
1008	\$H	CTRL H/ BACKSPACE ¹
1009	\$I	CTRL I/ HORIZONTAL TAB ¹
1010	\$J	CTRL J
1011	\$K	CTRL K
1012	\$L	CTRL L
1013	\$M	CTRL M/ ENTER ¹
1014	\$N	CTRL N
1015	\$O	CTRL O

The keystroke in bold is sent only if the “Function Key Mapping” is enabled. Otherwise, the unbolded keystroke is sent.

Table F-1 ASCII Value Standard Default Parameters Table (Continued)

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
1016	\$P	CTRL P
1017	\$Q	CTRL Q
1018	\$R	CTRL R
1019	\$S	CTRL S
1020	\$T	CTRL T
1021	\$U	CTRL U
1022	\$V	CTRL V
1023	\$W	CTRL W
1024	\$X	CTRL X
1025	\$Y	CTRL Y
1026	\$Z	CTRL Z
1027	%A	CTRL [
1028	%B	CTRL \
1029	%C	CTRL]
1030	%D	CTRL 6
1031	%E	CTRL -
1032	Space	Space
1033	/A	!
1034	/B	"
1035	/C	#
1036	/D	?
1037	/E	%
1038	/F	&
1039	/G	'
1040	/H	(
1041	/I)
1042	/J	*
1043	/K	+

The keystroke in bold is sent only if the "Function Key Mapping" is enabled. Otherwise, the unbolded keystroke is sent.

Table F-1 ASCII Value Standard Default Parameters Table (Continued)

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
1044	/L	,
1045	-	-
1046	.	.
1047	/o	/
1048	0	0
1049	1	1
1050	2	2
1051	3	3
1052	4	4
1053	5	5
1054	6	6
1055	7	7
1056	8	8
1057	9	9
1058	/Z	:
1059	%F	;
1060	%G	<
1061	%H	=
1062	%I	>
1063	%J	?
1064	%V	@
1065	A	A
1066	B	B
1067	C	C
1068	D	D
1069	E	E
1070	F	F
1071	G	G

The keystroke in bold is sent only if the “Function Key Mapping” is enabled. Otherwise, the unbolded keystroke is sent.

Table F-1 ASCII Value Standard Default Parameters Table (Continued)

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
1072	H	H
1073	I	I
1074	J	J
1075	K	K
1076	L	L
1077	M	M
1078	N	N
1079	O	O
1080	P	P
1081	Q	Q
1082	R	R
1083	S	S
1084	T	T
1085	U	U
1086	V	V
1087	W	W
1088	X	X
1089	Y	Y
1090	Z	Z
1091	%K	[
1092	%L	\
1093	%M]
1094	%N	^
1095	%O	_
1096	%W	'
1097	+A	a
1098	+B	b
1099	+C	c

The keystroke in bold is sent only if the “Function Key Mapping” is enabled. Otherwise, the unbolded keystroke is sent.

Table F-1 ASCII Value Standard Default Parameters Table (Continued)

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
1100	+D	d
1101	+E	e
1102	+F	f
1103	+G	g
1104	+H	h
1105	+I	i
1106	+J	j
1107	+K	k
1108	+L	l
1109	+M	m
1110	+N	n
1111	+O	o
1112	+P	p
1113	+Q	q
1114	+R	r
1115	+S	s
1116	+T	t
1117	+U	u
1118	+V	v
1119	+W	w
1120	+X	x
1121	+Y	y
1122	+Z	z
1123	%P	{
1124	%Q	
1125	%R	}
1126	%S	~

The keystroke in bold is sent only if the “Function Key Mapping” is enabled. Otherwise, the unbolded keystroke is sent.

Table F-2 *ALT Key Standard Default Tables*

ALT Keys	Keystroke
2064	ALT 2
2065	ALT A
2066	ALT B
2067	ALT C
2068	ALT D
2069	ALT E
2070	ALT F
2071	ALT G
2072	ALT H
2073	ALT I
2074	ALT J
2075	ALT K
2076	ALT L
2077	ALT M
2078	ALT N
2079	ALT O
2080	ALT P
2081	ALT Q
2082	ALT R
2083	ALT S
2084	ALT T
2085	ALT U
2086	ALT V
2087	ALT W
2088	ALT X
2089	ALT Y
2090	ALT Z

Table F-3 Misc. Key Standard Default Table

Misc. Key	Keystroke
3001	PA 1
3002	PA 2
3003	CMD 1
3004	CMD 2
3005	CMD 3
3006	CMD 4
3007	CMD 5
3008	CMD 6
3009	CMD 7
3010	CMD 8
3011	CMD 9
3012	CMD 10
3013	CMD 11
3014	CMD 12
3015	CMD 13
3016	CMD 14

Table F-4 GUI Shift Keys

Other Value	Keystroke
3048	GUI 0
3049	GUI 1
3050	GUI 2
3051	GUI 3
3052	GUI 4
3053	GUI 5
3054	GUI 6
3055	GUI 7
3056	GUI 8

The Apple™ iMac keyboard has an apple key on either side of the space bar. Windows-based systems have a GUI key to the left of the left ALT key, and to the right of the right ALT key.

Table F-4 GUI Shift Keys (Continued)

Other Value	Keystroke
3057	GUI 9
3065	GUI A
3066	GUI B
3067	GUI C
3068	GUI D
3069	GUI E
3070	GUI F
3071	GUI G
3072	GUI H
3073	GUI I
3074	GUI J
3075	GUI K
3076	GUI L
3077	GUI M
3078	GUI N
3079	GUI O
3080	GUI P
3081	GUI Q
3082	GUI R
3083	GUI S
3084	GUI T
3085	GUI U
3086	GUI V
3087	GUI W
3088	GUI X
3089	GUI Y
3090	GUI Z

The Apple™ iMac keyboard has an apple key on either side of the space bar. Windows-based systems have a GUI key to the left of the left ALT key, and to the right of the right ALT key.

Table F-5 *PF Key Standard Default Table*

PF Keys	Keystroke
4001	PF 1
4002	PF 2
4003	PF 3
4004	PF 4
4005	PF 5
4006	PF 6
4007	PF 7
4008	PF 8
4009	PF 9
4010	PF 10
4011	PF 11
4012	PF 12
4013	PF 13
4014	PF 14
4015	PF 15
4016	PF 16

Table F-6 *F key Standard Default Table*

F Keys	Keystroke
5001	F 1
5002	F 2
5003	F 3
5004	F 4
5005	F 5
5006	F 6
5007	F 7
5008	F 8
5009	F 9

Table F-6 *F key Standard Default Table (Continued)*

F Keys	Keystroke
5010	F 10
5011	F 11
5012	F 12
5013	F 13
5014	F 14
5015	F 15
5016	F 16
5017	F 17
5018	F 18
5019	F 19
5020	F 20
5021	F 21
5022	F 22
5023	F 23
5024	F 24

Table F-7 *Numeric Key Standard Default Table*

Numeric Keypad	Keystroke
6042	*
6043	+
6044	Undefined
6045	-
6046	.
6047	/
6048	0
6049	1
6050	2
6051	3
6052	4

Table F-7 *Numeric Key Standard Default Table (Continued)*

Numeric Keypad	Keystroke
6053	5
6054	6
6055	7
6056	8
6057	9
6058	Enter
6059	Num Lock

Table F-8 *Extended Keypad Standard Default Table*

Extended Keypad	Keystroke
7001	Break
7002	Delete
7003	Pg Up
7004	End
7005	Pg Dn
7006	Pause
7007	Scroll Lock
7008	Backspace
7009	Tab
7010	Print Screen
7011	Insert
7012	Home
7013	Enter
7014	Escape
7015	Up Arrow
7016	Dn Arrow
7017	Left Arrow
7018	Right Arrow

Glossary

A

Aperture. The opening in an optical system defined by a lens or baffle that establishes the field of view.

ASCII. American Standard Code for Information Interchange. A 7 bit-plus-parity code representing 128 letters, numerals, punctuation marks and control characters. It is a standard data transmission code in the U.S.

Autodiscrimination. The ability of an interface controller to determine the code type of a scanned bar code. After this determination is made, the information content is decoded.

B

Bar. The dark element in a printed bar code symbol.

Bar Code. A pattern of variable-width bars and spaces which represents numeric or alphanumeric data in machine-readable form. The general format of a bar code symbol consists of a leading margin, start character, data or message character, check character (if any), stop character, and trailing margin. Within this framework, each recognizable symbology uses its own unique format. See **Symbology**.

Bar Code Density. The number of characters represented per unit of measurement (e.g., characters per inch).

Bar Height. The dimension of a bar measured perpendicular to the bar width.

Bar Width. Thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.

Bit. Binary digit. One bit is the basic unit of binary information. Generally, eight consecutive bits compose one byte of data. The pattern of 0 and 1 values within the byte determines its meaning.

Bits per Second (bps). Bits transmitted or received.

Bluetooth. A technology that provides a way to connect and exchange information between devices such as scanners, mobile phones, laptops, PCs, and printers over a secure, globally unlicensed short-range radio frequency.

Boot or Boot-up. The process a computer goes through when it starts. During boot-up, the computer can run self-diagnostic tests and configure hardware and software.

bps. See **Bits Per Second**.

Byte. On an addressable boundary, eight adjacent binary digits (0 and 1) combined in a pattern to represent a specific character or numeric value. Bits are numbered from the right, 0 through 7, with bit 0 the low-order bit. One byte in memory is used to store one ASCII character.

C

CDRH. Center for Devices and Radiological Health. A federal agency responsible for regulating laser product safety. This agency specifies various laser operation classes based on power output during operation.

CDRH Class 1. This is the lowest power CDRH laser classification. This class is considered intrinsically safe, even if all laser output were directed into the eye's pupil. There are no special operating procedures for this class.

CDRH Class 2. No additional software mechanisms are needed to conform to this limit. Laser operation in this class poses no danger for unintentional direct human exposure.

Character. A pattern of bars and spaces which either directly represents data or indicates a control function, such as a number, letter, punctuation mark, or communications control contained in a message.

Character Set. Those characters available for encoding in a particular bar code symbology.

Check Digit. A digit used to verify a correct symbol decode. The scanner inserts the decoded data into an arithmetic formula and checks that the resulting number matches the encoded check digit. Check digits are required for UPC but are optional for other symbologies. Using check digits decreases the chance of substitution errors when a symbol is decoded.

Codabar. A discrete self-checking code with a character set consisting of digits 0 to 9 and six additional characters: (- \$: / , +).

Code 128. A high density symbology which allows the controller to encode all 128 ASCII characters without adding extra symbol elements.

Code 3 of 9 (Code 39). A versatile and widely used alphanumeric bar code symbology with a set of 43 character types, including all uppercase letters, numerals from 0 to 9 and 7 special characters (- . / + % \$ and space). The code name is derived from the fact that 3 of 9 elements representing a character are wide, while the remaining 6 are narrow.

Code 93. An industrial symbology compatible with Code 39 but offering a full character ASCII set and a higher coding density than Code 39.

Code Length. Number of data characters in a bar code between the start and stop characters, not including those characters.

Cold Boot. A cold boot restarts a computer and closes all running programs.

COM Port. Communication port; ports are identified by number, e.g., COM1, COM2.

Continuous Code. A bar code or symbol in which all spaces within the symbol are parts of characters. There are no intercharacter gaps in a continuous code. The absence of gaps allows for greater information density.

Cradle. A cradle is used for charging the terminal battery and for communicating with a host computer, and provides a storage place for the terminal when not in use.

D

Dead Zone. An area within a scanner's field of view, in which specular reflection may prevent a successful decode.

Decode. To recognize a bar code symbology (e.g., UPC/EAN) and then analyze the content of the specific bar code scanned.

Decode Algorithm. A decoding scheme that converts pulse widths into data representation of the letters or numbers encoded within a bar code symbol.

Decryption. Decryption is the decoding and unscrambling of received encrypted data. Also see, **Encryption** and **Key**.

Depth of Field. The range between minimum and maximum distances at which a scanner can read a symbol with a certain minimum element width.

Discrete Code. A bar code or symbol in which the spaces between characters (intercharacter gaps) are not part of the code.

Discrete 2 of 5. A binary bar code symbology representing each character by a group of five bars, two of which are wide. The location of wide bars in the group determines which character is encoded; spaces are insignificant. Only numeric characters (0 to 9) and START/STOP characters may be encoded.

E

EAN. European Article Number. This European/International version of the UPC provides its own coding format and symbology standards. Element dimensions are specified metrically. EAN is used primarily in retail.

Element. Generic term for a bar or space.

Encoded Area. Total linear dimension occupied by all characters of a code pattern, including start/stop characters and data.

ENQ (RS-232). ENQ software handshaking is also supported for the data sent to the host.

ESD. Electro-Static Discharge

H

HID. Human Interface Device. A Bluetooth host type.

Host Computer. A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs and network control.

Hz. Hertz; A unit of frequency equal to one cycle per second.

I

IEC. International Electrotechnical Commission. This international agency regulates laser safety by specifying various laser operation classes based on power output during operation.

IEC (825) Class 1. This is the lowest power IEC laser classification. Conformity is ensured through a software restriction of 120 seconds of laser operation within any 1000 second window and an automatic laser shutdown if the scanner's oscillating mirror fails.

Intercharacter Gap. The space between two adjacent bar code characters in a discrete code.

Interleaved 2 of 5. A binary bar code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bar/spaces) within each group determines which characters are encoded. This continuous code type uses no intercharacter spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.

Interleaved Bar Code. A bar code in which characters are paired together, using bars to represent the first character and the intervening spaces to represent the second.

Input/Output Ports. I/O ports are primarily dedicated to passing information into or out of the terminal's memory. Series 9000 mobile computers include Serial and USB ports.

I/O Ports. interface The connection between two devices, defined by common physical characteristics, signal characteristics, and signal meanings. Types of interfaces include RS-232 and PCMCIA.

K

Key. A key is the specific code used by the algorithm to encrypt or decrypt the data. Also see, **Encryption** and **Decrypting**.

L

LASER. Light Amplification by Stimulated Emission of Radiation. The laser is an intense light source. Light from a laser is all the same frequency, unlike the output of an incandescent bulb. Laser light is typically coherent and has a high energy density.

Laser Diode. A gallium-arsenide semiconductor type of laser connected to a power source to generate a laser beam. This laser type is a compact source of coherent light.

Laser Scanner. A type of bar code reader that uses a beam of laser light.

LED Indicator. A semiconductor diode (LED - Light Emitting Diode) used as an indicator, often in digital displays. The semiconductor uses applied voltage to produce light of a certain frequency determined by the semiconductor's particular chemical composition.

Light Emitting Diode. See **LED**.

M

MIL. 1 mil = 1 thousandth of an inch.

MIN. Mobile Identification Number. The unique account number associated with a cellular device. It is broadcast by the cellular device when accessing the cellular system.

Misread (Misdecode). A condition which occurs when the data output of a reader or interface controller does not agree with the data encoded within a bar code symbol.

MRD. Minimum reflective difference. A measurement of print contrast.

N

Nominal. The exact (or ideal) intended value for a specified parameter. Tolerances are specified as positive and negative deviations from this value.

Nominal Size. Standard size for a bar code symbol. Most UPC/EAN codes are used over a range of magnifications (e.g., from 0.80 to 2.00 of nominal).

O

ODI. See **Open Data-Link Interface**.

Open Data-Link Interface (ODI). Novell's driver specification for an interface between network hardware and higher-level protocols. It supports multiple protocols on a single NIC (Network Interface Controller). It is capable of understanding and translating any network information or request sent by any other ODI-compatible protocol into something a NetWare client can understand and process.

Open System Authentication. Open System authentication is a null authentication algorithm.

P

PAN . Personal area network. Using Bluetooth wireless technology, PANs enable devices to communicate wirelessly. Generally, a wireless PAN consists of a dynamic group of less than 255 devices that communicate within about a 33-foot range. Only devices within this limited area typically participate in the network.

Parameter. A variable that can have different values assigned to it.

Percent Decode. The average probability that a single scan of a bar code would result in a successful decode. In a well-designed bar code scanning system, that probability should approach near 100%.

Print Contrast Signal (PCS). Measurement of the contrast (brightness difference) between the bars and spaces of a symbol. A minimum PCS value is needed for a bar code symbol to be scannable. $PCS = (RL - RD) / RL$, where RL is the reflectance factor of the background and RD the reflectance factor of the dark bars.

Programming Mode. The state in which a scanner is configured for parameter values. See **Scanning Mode**.

Q

Quiet Zone. A clear space, containing no dark marks, which precedes the start character of a bar code symbol and follows the stop character.

QWERTY. A standard keyboard commonly used on North American and some European PC keyboards. "QWERTY" refers to the arrangement of keys on the left side of the third row of keys.

R

Reflectance. Amount of light returned from an illuminated surface.

Resolution. The narrowest element dimension which is distinguished by a particular reading device or printed with a particular device or method.

RF. Radio Frequency.

RS-232. An Electronic Industries Association (EIA) standard that defines the connector, connector pins, and signals used to transfer data serially from one device to another.

S

Scan Area. Area intended to contain a symbol.

Scanner. An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol. Its three main components are: 1) Light source (laser or photoelectric cell) - illuminates a bar code;; 2) Photodetector - registers the difference in reflected light (more light reflected from spaces); 3) Signal conditioning circuit - transforms optical detector output into a digitized bar pattern.

Scanning Mode. The scanner is energized, programmed and ready to read a bar code.

Scanning Sequence. A method of programming or configuring parameters for a bar code reading system by scanning bar code menus.

Self-Checking Code. A symbology that uses a checking algorithm to detect encoding errors within the characters of a bar code symbol.

Space. The lighter element of a bar code formed by the background between bars.

Specular Reflection. The mirror-like direct reflection of light from a surface, which can cause difficulty decoding a bar code.

SPP. Serial Port Profile.

Start/Stop Character. A pattern of bars and spaces that provides the scanner with start and stop reading instructions and scanning direction. The start and stop characters are normally to the left and right margins of a horizontal code.

Substrate. A foundation material on which a substance or image is placed.

Symbol. A scannable unit that encodes data within the conventions of a certain symbology, usually including start/stop characters, quiet zones, data characters and check characters.

Symbol Aspect Ratio. The ratio of symbol height to symbol width.

Symbol Height. The distance between the outside edges of the quiet zones of the first row and the last row.

Symbol Length. Length of symbol measured from the beginning of the quiet zone (margin) adjacent to the start character to the end of the quiet zone (margin) adjacent to a stop character.

Symbology. The structural rules and conventions for representing data within a particular bar code type (e.g. UPC/EAN, Code 39, PDF417, etc.).

T

Tolerance. Allowable deviation from the nominal bar or space width.

U

UPC. Universal Product Code. A relatively complex numeric symbology. Each character consists of two bars and two spaces, each of which is any of four widths. The standard symbology for retail food packages in the United States.

V

Visible Laser Diode (VLD). A solid state device which produces visible laser light.

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