PROGRAMMING GUIDE

Part No. : MUL-53221-07

PROGRAMMING GUIDE

for

BARCODE SCANNERS

The guide can be used as keyboard emulation, RS- 232C serial interface, and USB 1.1 interface and wand emulation.

IMPORTANT NOTICE

This is a general guide for varies scanners, and not all functions will perform in every scanners. Other than specified in this guide, for any special functions or specifications, please contact your dealer for details.

Every effort is made to ensure the accuracy of our product information; however, we accept no responsibility for errors or omissions including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. We shall not be liable for errors contained herein or for incidental consequential damages in connection with the furnishing, performance, or use of this material.

Specification or version may be subject to change without notice. The actual specification and version are based on the product delivered.

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1. INTRODUCTION

Scanning a series of programming bar code labels can configure the series scanners. This allows decoding options and interface protocols to be tailored to a specific application. The configuration is stored in non-volatile memory and will not be lost by removing power from the scanner.

The scanner must be properly powered before programming. For RS-232C type scanners, an external power adapter must be used to supply DC power to the scanner. If a keyboard emulation type scanner is used with an IBM PC/XT/AT, PS/2 or any fully compatible computers, power will be drawn from the keyboard port. No external power adapter is required. If keyboard emulation type scanner is used with any other non IBM PC compatible computers, an external power adapter may be needed.

During the programming mode, the laser scanner will acknowledge a good and valid reading with a short beep. It will give long beeps for either an invalid or bad reading.

2. PROGRAMMING OPTIONS

Programmable options are divided into four groups. The first group includes the options that show the general behavior of the laser scanner. The second group of options governs the operation of RS-232C type serial ports. The third group selects the keyboard type that the keyboard emulation type will be emulated. The last group sets the decoding parameters for each barcode symbology.

3. DEFAULT PARAMETERS

This table gives the default settings of all the programmable parameters. The default settings will be restored whenever the "Reset" programming label is scanned and the laser scanner is in programming mode.

DEFAULT VALUES OF OPERATING PARAMETERS

Function	Default Values
Scanning Mode Selection	Trigger mode
Header and trailer	None
Inter-Message delay	Normal
Inter-Character delay	Normal
Message/Block mode selection	Message
Send command in block mode communication	Disable
Good read beeper tone selection	Medium
Code identifier transmitting	Disable

PREDEFINED BARCODE IDENTIFIERS*

Code 39 barcode identifier code	M
ITF 2 of 5 barcode identifier code	I
Chinese post code identifier code	H
UPC-E barcode identifier code	E
UPC-A barcode identifier code	A
EAN-13 barcode identifier code	F
EAN-8 barcode identifier code	FF
Codabar barcode identifier code	N
Code 128 barcode identifier code	K
Code 93 barcode identifier code	L
MSI barcode identifier code	P
MATRIX 25 barcode identifier code	G

*

DEFAULT VALUES OF KEYBOARD EMULATION PARAMETERS SETTING

Function	Default Values
Keyboard type selection	IBM PC/AT USA
Message terminator	Enter/ carriage Return

DEFAULT VALUES OF RS-232C SERIAL COMMUNICATION PARAMETERS

Function	Default Values
Handshaking protocol	None
ACK/NAK response time setting	300 msec
Baud rate	9600
Data bit	8
Stop bit	1
Parity	Mark
Message terminator selection	CR/LF

DEFAULT VALUES OF WAND EMULATION PARAMETERS

	Function	Default Values
※	Wand emulation speed	Normal
※	Wand emulation output	Black = High

Note: For wand emulation, the configuration is only effective for the items with asterisk (※).

DEFAULT VALUES OF USB EMULATION PARAMETERS

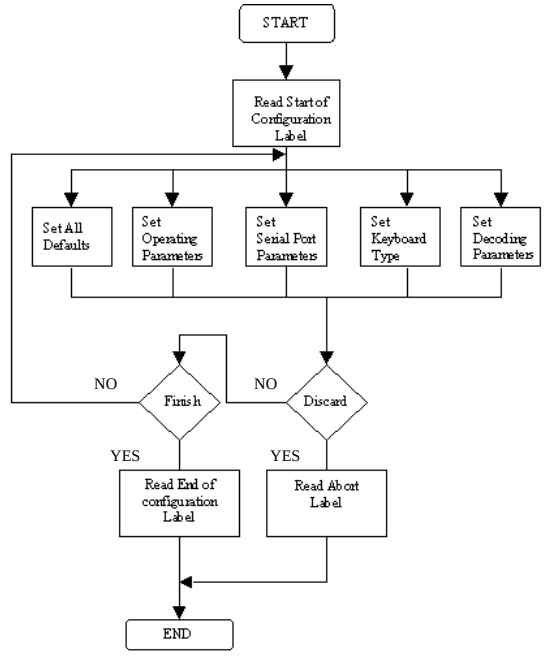
	Function	Default Values
※	Keyboard Type	US Keyboard
※	Message Terminator	Enter

DEFAULT VALUES OF DECODING PARAMETERS

Function	Code	Default Value
Reading codes Selection	Code 39	Enable
	ITF 2 of 5	Enable
	Chinese Post Code	Disable
	UPC/EAN/JAN	Enable
	Coda bar	Enable
	※ MSI	Disable
	Code 128	Enable
	Code 93	Enable
	※ ITAT	Disable
	※ EAN-128	Disable
	※ MATRIX 25	Disable
	※ Italian Pharmacy	Disable
	ISSN/ ISBN	Disable
Code 39	Codes	Standard
	Start/stop characters	Not transmitting
	Check digit	Disabled
	Concatenation	Off
Interleaved 2 of 5	Length	6-32 digits
	Check digit	Disable
Chinese Post Code	Length	10~16 digits
	Check digit	Transmit
UPC/EAN/JAN	Format	All
	Addendum	Disable
	UPC-E=UPC-A	Disabled
	UPC-A leading digit	Transmit
	UPC-A check digit	Transmit
	UPC-E leading digit	Transmit
	UPC-E check digit	Transmit
Coda bar	Type	Standard
	Start/stop characters	A, B, C, D
	Length	6~32 digits
Code 128	FNC 2 append	Disable
	Check digit	Disable
MSI	Length	Variable
	Check digit	Transmit
Italian Pharmacy	Transmit "A" Character	Not transmitting
MATRIX 25	Length	Fix 10 digits
	Check digit	Disable

Note: The configuration of the items with asterisk (※) is effective when being appointed in advance.

4. PROGRAM PROCEDURE USING BARCODE MENUS



SYSTEM SETTING


Start of Configuration


RESET

- The reading of the "RESET" label turns all the parameters back to default values.
- When you intend to turn your scanner back to default parameter, please scans the "Start of configuration" label first, then scan "RESET" label


ABORT

- The reading of the "ABORT" label discards all the parameters read prior to the "End of configuration".


RS-232C

- The scanner remains in the last interface mode when the scanner is reset. The label below should be scanned if the scanner is configured the first time.


PC/AT


USB

- The reading of the “SHOW VERSION” label will be show firmware version.


WAND EMULATION


SHOW VERSION


End of Configuration

GENERAL CONFIGURATION

Start of Configuration

SCANNING MODE SELECTION (for laser scanner)

For series laser scanners, there are 3 scanning modes to suit your application requirements.

Trigger Mode

The scanner becomes inactive as soon as the data is transmitted. It must be triggered to become active again.

Pulse Mode

The scanner will light up when press the pulse mode trigger switch once. And, the scanner will turn off for next pressing.

SCANNING MODE SELECTION (For CCD scanner)

The scanner becomes inactive as soon as the data is transmitted. It must be triggered to become active again.

Trigger mode

In auto scan mode, the scanner is still active after the data is transmitted, but the successive transmission of the same bar code is not allowed when the trigger switch is pressed again.

Auto scan mode

This scanner will light up when press the scanner trigger switch once. And, the scanner will turn off for next pressing.

Alternate mode

This mode is similar to Auto scan mode, but double reading for the same barcode is prohibited if the scanner switch is pressed.

Repeat mode

End of Configuration

Start of Configuration

DATA REDUNDANT CHECK

The option allows you to set decoder data redundant check.

Enable

Disable

INTER-MESSAGE DELAY

These series of scanners allow you to add a delay between two consecutive messages. This delay will be added before each data transmission.

None

100 msec

500 msec

1 Second

INTER-CHARACTER DELAY

This option governs delay time between consecutive characters. Scanning the following labels can alter the delay time.

None

10 msec

20 msec

50 msec

MESSAGE/BLOCK MODE SELECTION

This option allows you to treat scanned data as either an independent message or a block message. In the message mode, the data scanned will be transmitted immediately. In block mode, the data scanned will be appended to the message buffer if the scanner is programmed in block mode. A block of message will only be transmitted after a "Send" command is entered. This mode is only available when the scanner is working with code 39 labels. You are free to choose any character as the " Send" command.

Message

Block

End of Configuration

Start of Configuration

SEND COMMAND IN BLOCK MODE COMMUNICATION

You can use this option to set your own “Send” command used in block mode communication.

Enable

Disable

Store

Set

GOOD READ BEEPER TONE SELECTION

You can use this option to set frequency and / or duration of the buzzer after successful reading.

Medium

Low

High

Disable

SOUND DURATION

long(120 ms)

Medium(50 ms)

Short(20 ms)

Very short(5 ms)

End of Configuration

INTERFACE CONFIGURATION

Start of Configuration

1. RS-232C SERIAL COMMUNICATION PARAMETERS SETTING

The RS-232C scanner supports four handshaking protocols. With these options of communication protocol, you can tailor the scanner to meet the requirement of most systems

HANDSHAKING PROTOCOL

None

RTS/CTS

ACK/NAK

Xon/Xoff

ACK/NAK RESPONSE TIME SETTING

300 msec

2 sec

500 msec

End of Configuration

Start of Configuration

ACK/NAK RESPONSE TIME SETTING (Cont'd)

3 sec

1 sec

5 sec

BAUD RATE

19200

9600

4800

2400

1200

600

DATA BIT

7

8

STOP BIT

1

2

PARITY

Even

Odd

Mark

Space

None

End of Configuration

Start of Configuration

MESSAGE TERMINATOR (FOR RS-232C TYPE ONLY)

None

CR/LF

CR

LF

H Tab

STX/ETX

EOT

2. KEYBOARD EMULATION PARAMETERS SETTING

KEYBOARD TYPE SELECTION

The keyboard emulation scanners can emulate a number of personal computers keyboard and a number of terminal keyboard. Keyboard emulation is activated whenever you have selected the type of keyboard for which the scanner is going to emulate. Choose the appropriate type of keyboard emulation by scanning the labels under the following labels.

IBM AT

PS/2 30-80

IBM 5550

IBM 5295 Terminal

IBM XT

IBM 5530-SC

IBM 5530-ZC

End of Configuration

Start of Configuration

KEYBOARD TYPE SELECTION (Cont'd)

NEC 9801

IBM 3196 Terminal

APPLE MAC II(※)

IBM 3477/3472 Terminal

PS2/30/56

IBM 3477 Terminal
(Without break code)

NEC 5200(※)

Note: The configuration of the items with asterisk (※) is optional.

KEYBOARD LANGUAGE SELECTION

USA

UK

Germany

French

Spanish

Italian

Swiss

Swedish

End of Configuration

Start of Configuration

MESSAGE TERMINATOR (FOR KEYBOARD WEDGE USE)

None

Return /Enter

Hor. TAB

Execute

KEYBOARD TYPE SELECTION

Scan Code Mode

Alt mode

BREAK CODE ON/ OFF SETTING (FOR IBM Terminals 31xx, 34xx, 37xx USE)

To select the interface for these IBM terminals, read the correct key transmission code.

ON

OFF

FUNCTION KEY ACTIVE ON/ OFF (FOR IBM AT USE)

Function keys can be concatenated with input data as header and/or trailer. See table on page 40.

ON

OFF

CAPITAL LOCK ON/ OFF

Select the suitable code to match your keyboard caps lock status.

ON

OFF

Function key emulation (only for PC/AT)

Numlock on/off

OFF

ON

End of Configuration

Start of Configuration

00H~1FH ASCII Code defined

Alt-mode code

Crtl+code

3. WAND EMULATION PARAMETERS SETTING

EMULATION SPEED SELECTION

Low

Medium

Normal

High

Higher

EMULATION DATA OUTPUT SELECTION

The decoded data output logic level can be set to befit the external decoder.

Black = High

Black = Low

WAND EMULATION NARROW/WIDE RATIO

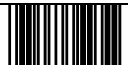
1:2

1:3

CURSOR PAD WORK AT NUMLOCK

ON

OFF



End of Configuration

Start of Configuration

4. USB INTERFACE PARAMETERS SETTING

The USB mode is effectively a keyboard emulator that works with hosts that USB-compatible operating system and USB ports. USB compatible operating systems are Windows 98, Windows NT 5.0 and later, no additional software is needed since the USB driver support is built into this operating system.

KEYBOARD TYPE

US Keyboard

International Keyboard

MESSAGE TERMINATOR

None

Enter

H Tab

End of Configuration

THE SYMBOLOGIES

Start of Configuration

READING CODE SELECTION

Code 39 Enable

Code 39 Disable

Coda bar Enable

Coda bar Disable

UPC/ EAN/ JAN Enable

UPC/ EAN/ JAN Disable

ITF 2 of 5 Enable

ITF 2 of 5 Disable

Chinese Post Code Enable

Chinese Post Code Disable

Code 128 Enable

Code 128 Disable

MSI Enable

MSI Disable

Code 93 Enable

Code 93 Disable

IATA Enable

IATA Disable

EAN- 128 Enable

EAN-128 Disable

MATRIX 25 Enable

MATRIX Disable

End of Configuration

Start of Configuration

READING CODE SELECTION (Cont'd)

Italian Pharmacy Enable

Italian Pharmacy Disable

CODE 39 PARAMETERS SETTING

CHARACTER SET

Standard Code 39

Full ASCII Code 39

START/STOP CHARACTER TRANSMISSION

Yes

No

CHECK DIGIT

Calculate and Transmit

Calculate but not Transmit

NO

CONCATENATION

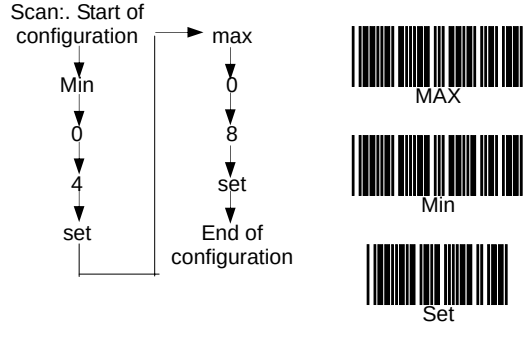
Enable

Disable

INTERLEAVED 2 OF 5 PARAMENTERS SETTING

Examples: Felting length 4 to 8 digits

LENTGTH



End of Configuration

Start of Configuration

CHECK DIGIT

NO

Calculate and Transmit

Calculate but not Transmit

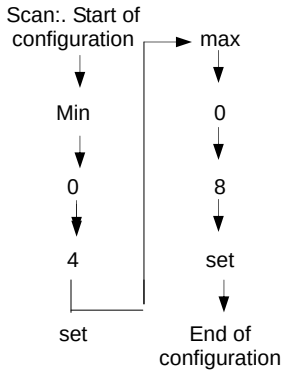
CHINESE POST CODE PARAMETERS SETTING

LENGTH

MAX

MIN

Set



CHECK DIGIT

NO

Calculate and Transmit

Calculate but not Transmit

UPC/EAN/JAN PARAMETERS SETTING

FORMAT

All

EAN-8 or EAN-13

UPC-A and EAN-13

UPC-A and UPC-E

UPC-A

UPC-E

End of Configuration

Start of Configuration

UPC/EAN/JAN PARAMETERS SETTING (Cont'd)

EAN-13

EAN-8

ADDENDUM

NO

5 Characters

2 Characters

2 or 5 Characters

FORCE UPC-E TO UPC-A FORMAT

Yes

No

FORCE UPC-A TO EAN-13 FORMAT

Yes

No

TRANSMIT UPC-A LEADING CHARACTER

Yes

No

TRANSMIT UPC-A CHECK DIGIT

Yes

No

TRANSMIT UPC-E LEADING CHARACTER

Yes

No

End of Configuration

Start of Configuration

TRANSMIT UPC-E CHECK DIGIT


Yes


No

TRANSMIT EAN-13 CHECK DIGIT


Yes


No

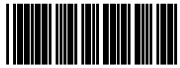
TRANSMIT EAN-8 CHECK DIGIT


Yes


No

CODABAR/ MONARCH PARAMETERS SETTING

START/ STOP CHARACTER TRANSMISSION


No


A, B, C, D


DC1~DC4


a/ t, b/ n, c/ *, d/ e

CONCATENATION


Enable


Disable

CODE 128 PARAMETERS SETTING

FNC 2 CONCATENATION


Enable


Disable


End of Configuration

Start of Configuration

CODE 128 PARAMETERS SETTING (Cont'd)

CHECK DIGIT

No

Calculate but not Transmit

Calculate and Transmit

UCC/EAN128 PARAMETERS SETTING

The character FNC1 can be transmitted or not using these codes.

FNC1 Character Transmitted

FNC1 not Transmitted

MATRIX 25 PARAMETERS SETTING

Examples: Felting length 4 to 8 characters

MAX

MIN

Set

Scan. Start of configuration → Min → 0 → 4 → set → max → 0 → 8 → set → End of configuration

MSI/PLESSY PARAMETERS SETTING

Examples: Felting length 4 to 8 characters

MAX

MIN

SET

Scan:. Start of configuration → Min → 0 → 4 → set → max → 0 → 8 → set → End of configuration

Double Check digit

Calculate but not Transmitted

No

Calculate but only first one Transmitted

Calculated and both Transmitted

Single Check digit

Calculated but not Transmitted

Calculated and transmitted

End of Configuration

Start of Configuration

MSI/PLESSY PARAMETERS SETTING (Cont'd)

PLESSY CODE SETTING

Calculated and transmitted

Calculate but not transmitted

CHECK DIGHT

No

Calculate and Transmit

Calculate but not Transmit

ITALIAN PHARMACY PARAMETERS SETTING

TRANSMIT "A" CHARACTER

Yes

No

BARCODE LENGTH SETTING

CODE 39 LENGTH SETTING

MAX

MIN

CODE 93 LENGTH SETTING

MAX

MIN

CODE 128 LENGTH SETTING

MAX

MIN

CODABAR LENGTH SETTING

MAX

MIN

SET

End of Configuration

Start of Configuration

ISBN/ ISSN CONVERSION

The function convents the UPC/EAN codes appearing on books and magazine not ISBN/ISSN format.

ACTIVE ISBN/ ISSN

INACTIVE ISBN/ ISSN

End of Configuration

DATA EDITING


Start of Configuration

HEADER AND TRAILER

This option allows you to append a header and/or a trailer to every message transmitted via the serial ports or the keyboard port. There is no restriction in selecting header or trailer characters as far as the sum of the lengths of header and trailer is not greater than 10 digits.


Header


Trailer


Set

1. Select either header or trailer you are going to program by scanning the corresponding label
2. Scan the character(s) you want from the enclosed ASCII table to set as header or trailer (be sure to enable full ASCII code 39 option before you start).
3. Read the "Set" label to set your choice into memory.

BARCODE IDENTIFIER CODE SELECTION

The series of scanners can transmit max.2-digit barcode identifier code for different types of barcodes. Use the labels to choose transmit or not transmit predefined barcode identifier code (ID's are listed on page 2):


Enable


Disable

BARCODE IDENTIFIER CODE SETTING

Each of the series type scanners can set max.2 digits as barcode identifier code according to different barcode. The procedure is as follows:

1. Scan "Start of configuration" label
2. Scan "Barcode identifier setting code" label.
3. Scan the new code mark from ASCII table (max. two digits). For example, if one "AB" want for code mark then scan "A" and "B".
4. Scan "Set" label.
5. Scan " End of configuration" label.


UPC-E


UPC-A


EAN-13


EAN-8


Chinese post code


ITF 2 OF 5


End of Configuration

Start of Configuration

BARCODE IDENTIFIER CODE SETTING (Cont'd)

Codabar

Code 39

Code 128

Code 93

MSI

MATRIX 25

Set

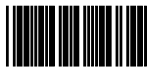
Truncate Header/Trailer Character

(Version az1.24, dz1.05, ac1.01, dz1.05,pl1.39 Or higher is required)

You can truncate a number header or trailer for a symbology. When you do, the specific character you select is deleted from the symbology you want.

Truncate header character

Truncate trailer character



set

1.scan"start of configuration"
2.select"truncate header or truncate trailer
3.scan two barcode value from the full ASCII code table(0~9) For example, if 2 number header you want clear then scan "0" and "2"

4. Scan" set" barcode
5. end of configuration

End of Configuration

APPENDIXES

CODE 39 FULL ASCII CODE TABLE

ASCII	CODE 39	VALEUR HEXA.		ASCII	CODE 39	VALEUR HEXA.
NUL	%U	00		%	/E	25
SOH	$A	01		&	/F	26
STX	$B	02		'	/G	27
ETX	$C	03		(	/H	28
EOT	$D	04		)	/I	29
ENQ	$E	05		*	/J	2A
ACK	$F	06		+	/K	2B
BEL	$G	07		,	/L	2C
BS	$H	08		-	-	2D
HT	$I	09		.	.	2E
LF	$J	0A		/	/	2F
VT	$K	0B		0	0	30
FF	$L	0C		1	1	31
CR	$M	0D		2	2	32
SO	$N	0E		3	3	33
SI	$O	0F		4	4	34
DLE	$P	10		5	5	35
DC1	$Q	11		6	6	36
DC2	$R	12		7	7	37
DC3	$S	13		8	8	38
DC4	$T	14		9	9	39
NAK	$U	15		:	/Z	3A
SYN	$V	16		;	%F	3B
ETB	$W	17		<	%G	3C
CAN	$X	18		=	%H	3D
EM	$Y	19		>	%I	3E
SUB	$Z	1A		?	%J	3F
ESC	%A	1B		@	%V	40
FS	%B	1C		A	A	41
GS	%C	1D		B	B	42
RS	%D	1E		C	C	43
US	%E	1F		D	D	44
SP	SP	20		E	E	45
!	/A	21		F	F	46
"	/B	22		G	G	47
#	/C	23		H	H	48
$	/D	24		I	I	49

CODE 39 FULL ASCII CODE TABLE

ASCII	CODE 39	VALEUR HEXA.		ASCII	CODE 39	VALEUR HEXA.
J	J	4A		e	+E	65
K	K	4B		f	+F	66
L	L	4C		g	+G	67
M	M	4D		h	+H	68
N	N	4E		i	+I	69
O	O	4F		j	+J	6A
P	P	50		k	+K	6B
Q	Q	51		l	+L	6C
R	R	52		m	+M	6D
S	S	53		n	+N	6E
T	T	54		o	+O	6F
U	U	55		p	+P	70
V	V	56		q	+Q	71
W	W	57		r	+R	72
X	X	58		s	+S	73
Y	Y	59		t	+T	74
Z	Z	5A		u	+U	75
[	%K	5B		v	+V	76
\	%L	5C		w	+W	77
]	%M	5D		x	+X	78
^	%N	5E		y	+Y	79
_	%O	5F		z	+Z	7A
`	%W	60		{	%P	7B
a	+A	61		|	%Q	7C
b	+B	62		}	%R	7D
c	+C	63		~	%S	7E
d	+D	64		DEL	%T	7F

APPENDIX A

FUNCTION KEY EMULATION

FUNCTION KEY	ASCII	CODE 39		FUNCTION KEY	ASCII	CODE 39
Ins	$A	01		F1	$Q	11
Del	$B	02		F2	$R	12
Home	$C	03		F3	$S	13
End	$D	04		F4	$T	14
Up	$E	05		F5	$U	15
Down	$F	06		F6	$V	16
Left	$G	07		F7	$W	17
Backspace	$H	08		F8	$X	18
TAB	$I	09		F9	$Y	19
Enter(num)	$J	0A		F10	$Z	1A
Right	$K	0B		F11	%A	1B
PgUp	$L	0C		F12	%B	1C
Enter	$M	0D		ESC	%C	1D
PgDn	$N	0E		Ctl(L)	%D	1E
shift	$O	0F		Alt(L)	%E	1F
5 (num)	$P	10				

APPENDIX B

CODE 39 FULL ASCII BARCODE TABLE

Start of Configuration

NUL

SOH
(Ins)

STX
(Del)

ETX
(Home)

EOT
(End)

ENQ
(Up)

ACK
(Down)

BEL
(Left)

BS
(Backspace)

HT
(TAB)

CODE 39 FULL ASCII BARCODE TABLE

LF
(Enter)(num)

VT
(Right)

FF
(PgUp)

CR
(Enter)

SO
(PgDn)

SI
shift(L)

DLE
5 (num)

DC1
(F1)

DC2
(F2)

DC3
(F3)

DC4
(F4)

NAK
(F5)

End of Configuration

APPENDIX B

CODE 39 FULL ASCII BARCODE TABLE

Start of Configuration

SYN
(F6)

ETB
(F7)

CAN
(F8)

EM
(F9)

SUB
(F10)

ESC
(F11)

FS
(F12)

GS
(ESC)

RS
Ctl (L)

US
Alt (L)

SP

!

"

#

APPENDIX B

CODE 39 FULL ASCII BARCODE TABLE

$

%

&

'

(

)

*

+

,

-

.

/

0

1

End of Configuration


Start of Configuration


2


3


4


5


6


7


8


9


:


;


<


=


>


?


@


A


B


C


D


E


F


G


H


I


J


K


L


M


N


O


End of Configuration


Start of Configuration


P


Q


R


S


T


U


V


W


X


Y


Z


[


\


]


^


_


`


a


b


c


d


e


f


g


h


i


j


k


End of Configuration


Start of Configuration


l


m


n


o


p


q


r


s


t


u


v


w


x


y


z


{


|


}


~


DEL


End of Configuration

BARCODE SAMPLES

Code 39

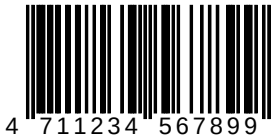
Code 128

Interleaved 2 of 5

Coda bar(NW-7)

UPC A

EAN-13



QUICK SETTINGS

1. Quick Settings for Keyboard Wedge Mode

2. Quick Settings for RS 232 Mode

3. Quick Settings for German Language Keyboard