Symbol Omnidirectional Scanner Advanced Programmer's Guide

Click on red text at any location in the manual to jump to the specified chapter, topic, or reference.

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symbol®

SYMBOL TECHNOLOGIES KNOW IT NOW

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FCC Information

This device complies with Part 15 of the FCC rules, and Canadian RSS:210. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Chapter 1
Advanced Data Formatting

Advanced Data formatting (ADF) is a means of customizing data before it is transmitted to your host device. Scanned data* can be edited to suit your particular requirements. Programming your scanner involves scanning a series of bar codes that represent the desired parameters.

LS 5000, LS 5100 and LS 5200 series scanners have a secondary scanner port that can be used for programming using an attached hand-held scanner or wand. In order to program these scanners, you need to first scan the **ENABLE PROGRAMMING** bar code on page 2-3. When you have finished, you must then scan the **DISABLE PROGRAM-MING** bar code on page 2-604.

All other Symbol omnidirectional scanners can be programmed at any time and do not require these symbols. For these scanners, simply scan the bar codes for the parameters you wish to set.

An *Input Source* must be selected **first**. A beeper table beginning on 1-12 will help guide you through the programming steps. **Note:** When using an LS 9100, the Primary Scanner Port (page 2-20) must be selected as the Input Source.

> *The LS 5000, LS 5100 and LS 5200 can also edit magstripe data.

Rules

To build a rule, you must select Criteria and Actions. The rules you enter must be logically correct. Criteria include **Input Source, Code Type, Code Length**, and **Message Containing a Specific Data String**. Actions are any alterations related to, or affecting these Criteria. Criteria, Actions, and entire Rules may be erased by scanning the appropriate bar code.

Criteria

Input Source

Select a single input or multiple source to be affected by this customized programming format. **An input source must be selected prior to creating any ADF rules**.

Code Types

Select any number of code types to be affected. All selected codes must be scanned in succession, prior to selecting other criteria. If you don't select a code type, all code types will be affected.

Code Length

Define the number of characters the selected code type must contain. If you don't select a code length, selected code types of any length will be affected.

Message Containing A Specific Data String

Select whether the formatting will affect data that begins with a specific character or data string, or contains a specific character or data string.

Specific String at Start - Scan this bar code, then scan the desired character or characters (up to a total of 8) in the *alphanumeric keyboard* bar codes.

Specific String, Any Location - Scan this bar code, then, using the *numeric keypad*, scan a two digit number representing the position (use a leading "zero" if necessary) Then scan the desired character or characters (up to a total of 8) on the *alphanumeric keyboard*, followed by the **End of Message** bar code.

Any Message OK - By not scanning any bar code, all selected code types will be formatted, regardless of information contained.

Actions

Select how to format the data for transmission.

> **Send Data** - Send all data that follows, send all data up to a specific character selected from the ***alphanumeric keyboard*** bar code, or send the next N characters. N = any number from 1 to 254, selected from the ***alphanumeric keyboard***.

> **Setup Field(s)** - Select predefined magstripe fields (Track 1 or Track 2, Acct Nr., Exp Data MMYY/YYMM, or Customer Name), or define fields as follows:

>> **Move Cursor To a Character** - Scan this bar code, then any printable ASCII character from the ***alphanumeric keyboard***.

>> **Move Cursor to Start** - Scan this bar code to move cursor to the beginning of the data.

>> **Move Cursor to Position "N"** - Scan this bar code, then select the position to which you wish to move (1 to 254) from the ***numeric keypad***.

>> **Move Cursor Ahead "N" Positions** - Scan this bar code, then select the number of positions ahead you wish to move (0 to 254) from the ***numeric keypad***.

>> **Move Cursor Back "N" Positions** - Scan this bar code, then select the number of positions back you wish to move (0 to 254) from the ***numeric keypad.***

Move Cursor Past a Character - This parameter will move the cursor past all occurrences of a selected character. Scan this bar code, then select a character from the *alphanumeric keyboard*.

Send Keystroke - Scan the "Send __" bar code for the keystroke you wish to send.

Setup Pause - Set the Pause Duration parameter in the Parameter Menus section of the *Product Reference Guide* prior to entering ADF. To insert a pause, scan the Send Pause bar code.

Modify Data - Modify data in the following ways:

Remove All Spaces - To remove all spaces, scan this bar code.

Crunch All Spaces - To leave one space between words, scan this bar code. This also removes all leading and trailing spaces.

Turn off Space Removal - Scan this bar code to disable space removal.

Pad Data on Left With Spaces - To pad data to the left, scan the bar code containing the desired number of spaces. This parameter is activated by Send commands.

Remove Leading Zeros - Scan this bar code to remove all leading zeros.

Turn off Zero Removal - Scan this bar code to disable the removal of zeros.

Pad Data on Left With Zeros - To pad data to the left, scan the bar code containing the desired number of zeros. This parameter is activated by Send commands.

Send Preset Value - Send Values 1 through 6 by scanning the appropriate bar code. These values must be set in the Prefix/Suffix parameter found in the Par;ameter Menus section of the ***Product Reference Guide***.

Value 1 = Scan Suffix

Value 2 = Scan Prefix

Value 3 = Magstripe Suffix

Value 4 = Magstripe Prefix

Value 5 = Serial Suffix

Value 6 = Serial Prefix

Alternate Rule Sets

ADF rules may be grouped into one of four alternate sets which can be turned on and off when needed. This is useful when you want to format the same message in different ways. For example, a Code 128 bar code contains the following information:

Class (2 digits), Stock Number (8) digits, Price (5 digits)

This bar code might look like this:

245671243701500

where:

Class = 24
Stock Number = 56712437
Price = 01500

Ordinarily you would send this data as follows:

24 (class key)
56712437 (stock key)
01500 (enter key)

But, when there is a sale, you may want to send only the following:

24 (class key)
56712437 (stock key)

and the cashier will key the price manually.

To implement this, you would first enter an ADF rule that applies to the normal situation. This rule may look like this:

> **When scanning a bar code of length 15, send the next 2 characters, send the class key, send the next 8 characters, send the stock key, send the data that remains, send the enter key.**

The "sale" rule may look like this:

> **When scanning a bar code of length 15, send the next 2 characters, send the class key, send the next 8 characters, send the stock key.**

To switch between the two sets of rules, a "switching rule" must be programmed. This rule specifies what type of bar code must be scanned to switch between the rule sets. For example, in the case of the "sale" rule above, the programmer wants the cashier to scan the barcode "M" before a sale. To do this, a rule can be entered as follows:

> **When scanning a bar code of length 1 that begins with "M", select rule set number 1.**

Another rule could be programmed to switch back.

> **When scanning a bar code of length 1 that begins with "N", turn off rule set number 1.**

The switching back to normal rules can also be done in the "sale" rule. For example, the rule may look like this:

> **When scanning a bar code of length 15, send the next 2 characters, send the class key, send the next 8 characters, send the stock key, turn off rule set 1.**

It is recommended that you scan the **DISABLE ALL RULE SETS** bar code after programming a rule belonging to an alternate rule set.

In addition to enabling and disabling rule sets within the rules, you can enable or disable them by scanning the appropriate bar codes on 2-14 to 2-18.

Rules Hierarchy (in Bar Codes)

When rules are created, they are stored at the "top" of a rules list. If three rules have been created, the list would be configured as follows:

Third Rule
Second Rule
First Rule

All inputs will check the rules list from top to bottom to determine if the criteria matches (and therefore, if the actions should occur). This illustrates the importance of the order in which the rules were created. Input will be modified into the form of the first matching set of criteria it finds.

For example, if the THIRD rule states:

> **When scanning a bar code of any length, send all data, then send the ENTER key.**

And the SECOND rule states:

> **When scanning a Code 128 bar code of length 12, send the first four characters, then send the ENTER key, then send all remaining data.**

If a Code 128 bar code of length 12 were scanned, the THIRD rule would be in effect. The SECOND rule would appear to not function.

Note also that ADF Rules are actually created when you use the standard data editing functions. Scan serial, and magstripe options are entered as ADF rules, and the hierarchy mentioned above also applies to them. These rules reside in the same "rule list" as ADF Rules, so the order of their creation is also important.

Default Rules

Every unit has a default rule to send all data, regardless of the source. Units with custom software may have one or more default rules burned in. The rules hierarchy will check user programmable rules first, then the default rules. Default rules can be disabled by entering the following general rule in the user programmable buffer:

> **When receiving data from any source, send all data.**

Since this rule always applies, ADF will never go into the default rules.

Beeper Definitions

Beeper Sequence	**Indication**
Short High-Low	Entry of a number is expected. Enter another digit. Add leading zeros to the front if necessary.
Short Low-Low	Entry of an alphabetic character is expected. Enter another character or scan the End of Message bar code.
Short High-High	Entry of Criterion/Action is expected. Enter another criterion or action, or scan the Save Rule bar code.
Short High-Low-High-Low	Rule saved. Rule entry mode exited.
Short High-Low-Low	All criteria or actions were cleared for rule currently being entered; continue entry of rule.
Short Low	Last saved rule was successfully deleted. The rule presently being entered is left intact.
Short Low-High-High	All rules are now deleted. The rule presently being entered is left intact. (This beep sequence has a different meaning outside of ADF.)

Beeper Sequence	Indication
Long Low-High-Low-High	Out of rule memory. Erase some existing rules, then try to save rule again. (The current rule need not be re-entered.)
Long Low-High-Low	Cancel rule entry. Rule entry mode exited because of an error or the user asked to exit rule entry.
Long Low-High	Entry error, wrong bar code scanned. Re-enter criterion or action. All previously entered criteria and actions are retained. Criteria or action list is too long for a rule.

ADF Bar Code Menu Example

This section will show you specifically how ADF rules are entered and used. Examples are given for each of the three data sources.

Formatting Scan Data

A local men's clothing store wants to encode a vendor number, size, and color code into their own Code 128 bar codes. The store also has products that carry UPC bar codes, placed there by the manufacturer. The Code 128 bar codes have the following format:

VVVVV SSSSCC

**Where V = Vendor Code
S = Size Code
C = Color Code**

The store uses an NCR 7052 cash register with buttons for vendor [F1], size [F2], and color code [F3]. At this store the UPC data is treated as one vendor code.

The following rules need to be entered:

> **When scanning data from any port, and the code type is Code 128, send the next 5 characters, send the vendor key [F1], send the next 4 characters, send the size key [F2], send the next 2 characters, send the color code key [F3].**

> **When scanning data from any port, and the code type is UPC/EAN, send all data, send the vendor key [F1].**

To enter these rules, follow the steps below and on the next page:

Rule 1: The Code 128 Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Either Scanner Port	2-22	High High
2	Code 128	2-42	High High
3	Send Next 5 Characters	2-111	High High
4	Send F1	2-437	High High
5	Send Next 4 Characters	2-110	High High
6	Send F2	2-438	High High
7	Send Next 2 Characters	2-108	High High
8	Send F3	2-439	High High
9	Save Rule	2-7	High Low High Low

Rule 2: The UPC Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Either Scanner Port	2-22	High High
2	UPC/EAN	2-51	High High
3	Send All Data That Remains	2-106	High High
4	Send F1	2-437	High High
5	Save Rule	2-7	High Low High Low

If you made any mistakes while entering this rule, scan **"Quit Entering Rules"** on page 2-6.

Formatting Magstripe Data (LS 5000/5100/5200)

A small department store chain called "the STORE" accepts all major credit cards, and their own credit card. They use a dual track magstripe reader with their Symbol product.

The major credit cards follow the standard encoding methods, but the store card is different. The word "STORE" appears in track 1 to identify the store's card. The two tracks of data contain the following information:

Track 1: >STORE - Last Name - First Name - Title<
Track 2: >Account Number - Social Security Number - Exp. Date<

A sample store credit card would look like this:

Track 1: >STORE - SMITH - JOHN - DR<
Track 2: >123456789012 - 111223333-1293<

The STORE's point of sale terminal has a "store credit card" key (F5), and a "bank credit card" key (F6). These keys are pressed before the credit card data is sent. If a STORE credit card is read, the following data is sent:

[F5] Account Number [ENTER] Last Name, First Name [ENTER]

Bank credit cards are sent as follows:

[F6] Account Number [ENTER] Customer Name [ENTER]

The following rules need to be entered:

> **When dual magstripe data is read, and the data contains "STORE" starting at position 2, send the [F5] key, select track 2, skip ahead 1 character, send all data up to "-", send the [ENTER] key, Select track 1, skip all data up to "-", send all data up to "-", send a comma, send all data up to dash, send [ENTER] key.**

> **When dual magstripe data is read, send the [F6] key, send the account number, send the [ENTER] key, send the expiration date, send the [ENTER] key, send the customer's name, send the [ENTER] key.**

The bank credit card rule was easier to enter because the card uses standard magstripe encoding. The order in which the rules are entered is important. The bank card rule must be entered first, followed by the store credit card rule. This way the store credit rule is checked first. If the store rule fails, the more general bank card rule would apply. If the rules were entered in reverse, the bank rule would always be executed, and the store rule would be ignored.

Rule 3: The Bank Credit Card Rule

Step	Bar Code	On Page	Beep Indication
1	Dual Magstripe Reader	2-27	High High
2	Send F6	2-442	High High
3	Send account number	2-127	High High
4	Send Enter Key	2-430	High High
5	Send Exp Date MMYY	2-128	High High
6	Send Enter key	2-430	High High
7	Send Customer's Name	2-130	High High
8	Send Enter key	2-430	High High
9	Save Rule	2-7	High Low High Low

Rule 4: The Store Credit Card Rule

Step	Bar Code	On Page	Beep Indication
1	Dual Magstripe Reader	2-27	High High
2	Specific String Any Location	2-84	High Low
3	0	2-536	High Low
4	2	2-538	Low Low

5	S	2-564	Low Low
6	T	2-565	Low Low
7	O	2-560	Low Low
8	R	2-563	Low Low
9	E	2-550	Low Low
10	End of Message	2-573	High High
11	Send F5	2-441	High High
12	Skip ahead 1 character	2-133	High High
13	Send up to character	2-85	Low Low
14	Dash "-"	2-514	High High
15	Send Enter Key	2-430	High High
16	Select Track 1 Data	2-131	High High
17	Move to character	2-86	Low Low
18	Dash "-"	2-514	High High
19	Send up to character	2-85	Low Low
20	Dash "-"	2-514	High High
21	Send Coma ","	2-265	High High
22	Send up to character	2-85	Low Low
23	Dash "-"	2-514	High High
24	Send Enter Key	2-430	High High

25	Save Rule	2-7	High Low High Low

This very long rule illustrates the ability of ADF to handle non-standard credit card formats. Most ADF users will be writing rules for standard credit cards, as illustrated in Rule 3.

Formatting Serial Data

A convenience store has a smart weight scale that transmits the price of an item, followed by the weight and description. The weight is a 6 digit number from 0 to 999.999. The price is a 6 digit number from 0 to 9999.99. The description is 30 characters long. For both weight and price, the decimal point is implied and not sent. Messages from the weight scale may look like the following:

   "000125001633   **Potato Salad**"
   "000785002010   **Roast Beef**"

The store uses an IBM AT wedge as a host. Data should be sent with the implied decimal points added. The leading zeros should be removed for price, but not weight. Leading spaces should be removed from the description. Tabs should be placed between each field. When data is read from the weight scale, the following data should be sent:

  1.25 [tab] 001.633 [tab] Potato Salad [ENTER]
  7.85 [tab] 002.010 [tab] Roast Beef [ENTER]

The following rules need to be entered:

> **When serial data is received, remove leading zeros, send next 4 characters, send period, stop zero removal, send next 2 characters, send tab key, send next 3 characters, send period, send next 3 characters, send tab, crunch all spaces, send all data that remains, send enter key.**
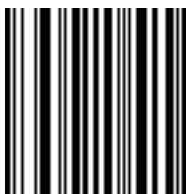
Special Commands
Rule Sets
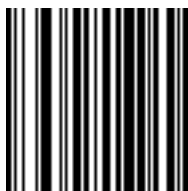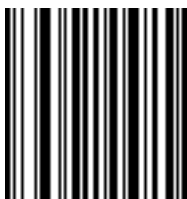

DISABLE RULE SET 1

Special Commands
Rule Sets

DISABLE RULE SET 2

Special Commands
Rule Sets

DISABLE RULE SET 3

Special Commands
Rule Sets

DISABLE RULE SET 4

Special Commands
Rule Sets

DISABLE ALL RULE SETS

Criteria
Code Lengths
This is *not* a keypad. Select one length per rule only.

16

Criteria
Code Lengths
This is *not* a keypad. Select one length per rule only.

17

Criteria

Code Lengths

This is *not* a keypad. Select one length per rule only.

18

Criteria
Code Lengths
This is *not* a keypad. Select one length per rule only.

19

Criteria
Code Lengths
This is *not* a keypad. Select one length per rule only.

20

Criteria
Code Lengths
This is *not* a keypad. Select one length per rule only.

21

Criteria
Code Lengths
This is *not* a keypad. Select one length per rule only.

22

Criteria

Code Lengths

This is *not* a keypad. Select one length per rule only.

23

Criteria

Code Lengths

This is *not* a keypad. Select one length per rule only.

24

Criteria

Code Lengths

This is *not* a keypad. Select one length per rule only.

25

Criteria
Code Lengths
This is *not* a keypad. Select one length per rule only.

26

Criteria

Code Lengths

This is *not* a keypad. Select one length per rule only.

27

Criteria
Code Lengths
This is *not* a keypad. Select one length per rule only.

28

Criteria

Code Lengths

This is *not* a keypad. Select one length per rule only.

29

Criteria

Code Lengths

This is *not* a keypad. Select one length per rule only.

30

Criteria
Specific Data String
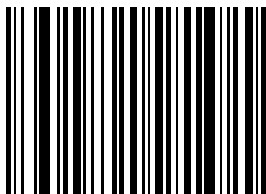
SPECIFIC STRING AT START

- Go to Alphanumeric Keyboard to enter string
  (Followed by **END OF MESSAGE** on)

Criteria
Specific Data String

SPECIFIC STRING ANY LOCATION

- Go to Numeric Keypad to enter location (2 digits), then
- Go to Alphanumeric Keyboard to enter string (Followed by **END OF MESSAGE** on 2-573)

Actions
Character

SEND UP TO CHARACTER*

*Enter character from alphanumeric keyboard.

Actions
Character

MOVE TO CHARACTER*

*Enter character from alphanumeric keyboard.

Actions
Character

MOVE PAST CHARACTER*

*Enter character from alphanumeric keyboard.

Actions
Send Pause

SEND PAUSE

Actions
Send Value

SEND VALUE 1

Actions
Send Value

SEND VALUE 2

Actions
Send Value

SEND VALUE 3

Actions
Send Value

SEND VALUE 4

Actions
Send Value

SEND VALUE 5

Actions
Send Value

SEND VALUE 6

Actions

Beeps

Choose only one beep sequence per ADF rule

BEEP ONCE

Actions

Beeps

Choose only one beep sequence per ADF rule.

BEEP TWICE

Actions

Beeps

Choose only one beep sequence per ADF rule

BEEP THREE TIMES

Actions
Turn On/Off Rule Sets

TURN ON RULE SET 1

Actions
Turn On/Off Rule Sets

TURN ON RULE SET 2

Actions
Turn On/Off Rule Sets

TURN ON RULE SET 3

Actions
Turn On/Off Rule Sets

TURN ON RULE SET 4

Actions
Turn On/Off Rule Sets

TURN OFF RULE SET 1

Actions
Send Characters/ Data

SEND NEXT 7 CHARACTERS

Actions
Send Characters/ Data
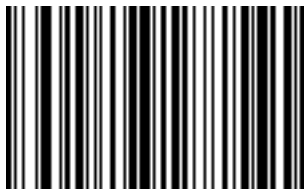
SEND NEXT 8 CHARACTERS

Actions
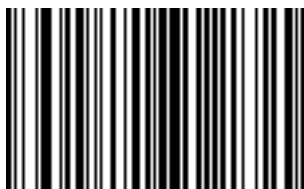**Send Characters/ Data**
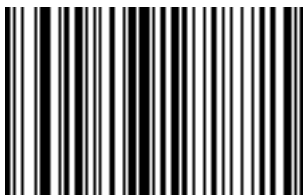
SEND NEXT 9 CHARACTERS

Actions
Send Characters/ Data
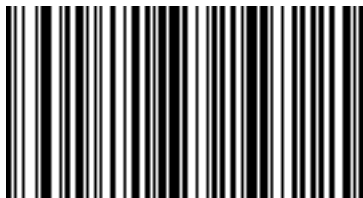
SEND NEXT 12 CHARACTERS

Actions
Send Characters/ Data

SEND NEXT 13 CHARACTERS

Actions
Send Characters/ Data
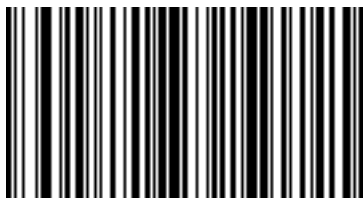
SEND NEXT 14 CHARACTERS

Actions
Send Characters/ Data
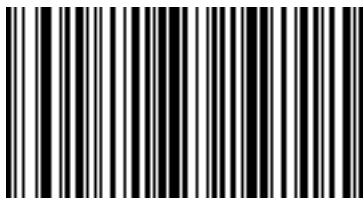
SEND NEXT 15 CHARACTERS

Actions
Send Characters/ Data

SEND NEXT 16 CHARACTERS

Actions
Send Characters/ Data

SEND NEXT 17 CHARACTERS

Actions
Send Characters/ Data

SEND NEXT 18 CHARACTERS

Actions
Send Characters/ Data

SEND NEXT 19 CHARACTERS

Actions
Send Characters/ Data
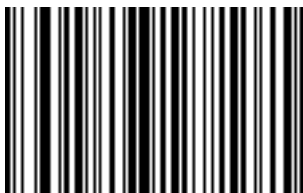
SEND NEXT 20 CHARACTERS

Actions
Send Characters/ Data

SEND ACCOUNT NUMBER*

This option applies only to those scanners that support a mag-stripe reader.

Actions
Send Characters/ Data

![barcode]
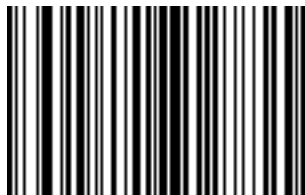
SEND EXP DATE (MMYY)*

This option applies only to those scanners that support a mag-stripe reader.

Actions
Send Characters/ Data

SEND EXP DATE (YYMM)*

This option applies only to those scanners that support a mag-stripe reader.

Actions
Send Characters/ Data

```
SEND CUSTOMER'S NAME*
```

This option applies only to those scanners that support a mag-stripe reader.

Actions
Send Characters/ Data

SELECT TRACK 1 DATA*

This option applies only to those scanners that support a mag-stripe reader.

Actions
Send Characters/ Data

SELECT TRACK 2 DATA*

This option applies only to those scanners that support a mag-stripe reader.

Actions
Skip Ahead/Back

SKIP AHEAD 1 CHARACTER

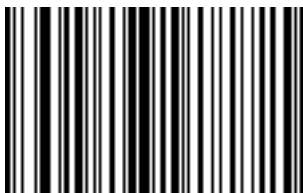## Actions
Skip Ahead/Back
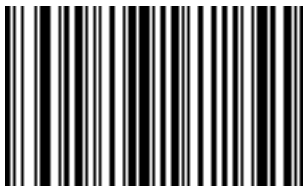
SKIP AHEAD 2 CHARACTERS

Actions
Skip Ahead/Back
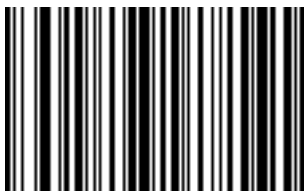
SKIP AHEAD 3 CHARACTERS

Actions
Skip Ahead/Back

SKIP AHEAD 4 CHARACTERS

Actions
Skip Ahead/Back

SKIP AHEAD 5 CHARACTERS

Actions
Skip Ahead/Back

SKIP AHEAD 6 CHARACTERS

Actions
Skip Ahead/Back
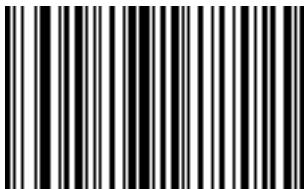
SKIP AHEAD 7 CHARACTERS

Actions
Skip Ahead/Back
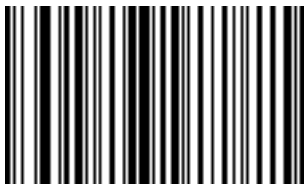
SKIP AHEAD 8 CHARACTERS

Actions
Skip Ahead/Back

SKIP AHEAD 9 CHARACTERS

Actions
Skip Ahead/Back

SKIP AHEAD 10 CHARACTERS

Actions
Skip Ahead/Back

SKIP BACK 1 CHARACTER

Actions
Skip Ahead/Back
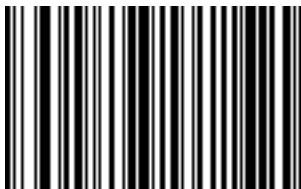
SKIP BACK 2 CHARACTERS

Actions
Skip Ahead/Back

SKIP BACK 3 CHARACTERS

Actions
Skip Ahead/Back

SKIP BACK 4 CHARACTERS

Alphanumeric Keyboard

G

Alphanumeric Keyboard

H

Alphanumeric Keyboard

I

Alphanumeric Keyboard

J

Alphanumeric Keyboard

K

Alphanumeric Keyboard

L

Alphanumeric Keyboard

M

Alphanumeric Keyboard

N

Alphanumeric Keyboard

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Alphanumeric Keyboard

P

Alphanumeric Keyboard

Q

Alphanumeric Keyboard

R

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S

Alphanumeric Keyboard

T

Alphanumeric Keyboard

U

Alphanumeric Keyboard

V

Alphanumeric Keyboard
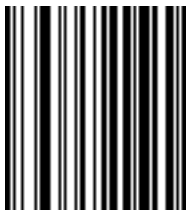
W

Alphanumeric Keyboard
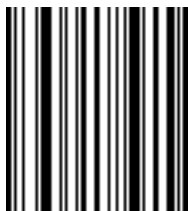

X

Alphanumeric Keyboard
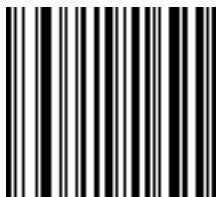

Y

Alphanumeric Keyboard

Z

Alphanumeric Keyboard

CANCEL

Alphanumeric Keyboard

END OF MESSAGE

Alphanumeric Keyboard

a

Alphanumeric Keyboard

b

Alphanumeric Keyboard

C

Alphanumeric Keyboard

d

Alphanumeric Keyboard

e

Alphanumeric Keyboard

f

Alphanumeric Keyboard

g

Alphanumeric Keyboard

h

Alphanumeric Keyboard

i

Alphanumeric Keyboard

j

Alphanumeric Keyboard

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Alphanumeric Keyboard

I

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Alphanumeric Keyboard

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Disable Programming

This bar code is needed for LS 5000, LS 5100 and LS 5200 series scanners only. All other Symbol omnidirectional scanners are programmed without using this bar code.

**DISABLE PROGRAMMING
(LS 5000/5100/5200)**