



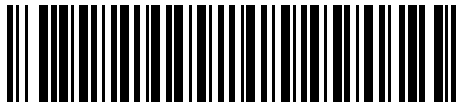
LS 4000 and LS 400Xi Series



Advanced Programmer's Guide



LS 4000 and LS 400Xi Series Advanced Programmer's Guide



70-35834-01
Revision B — February 2001

***LS 4000 and 400Xi Series
Advanced Programmer's Guide***

*70-35834-01
Revision B
February 2001*



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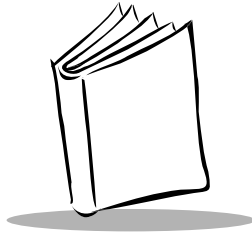
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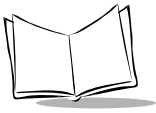
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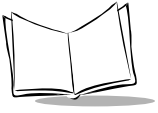
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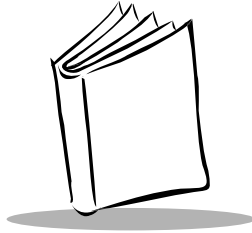
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LS 4000 and LS 400Xi Advanced Programmer's Guide



About This Manual

The *LS 4000 and LS 400Xi Advanced Programmers Guide* provides programming information and bar codes for the LS 4000 and LS 400Xi series scanners.

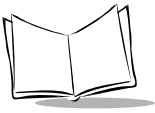
Notational Conventions

The following conventions are used in this document:

- ◆ LS 4000 refers to the LS 4000 series of scanners
- ◆ LS 400Xi refers to both the LS 4004i and the LS 4005i, unless specifically noted
- ◆ Bullets (•) indicate:
 - ◆ action items
 - ◆ lists of alternatives
 - ◆ lists of required steps that are not necessarily sequential.
- ◆ Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists
- ◆ References to other sections, chapters, or manuals appear in italics.

Related Publications

- ◆ *LS 400Xi Product Reference Guide*, p/n 70-37898-xx
- ◆ *LS 400Xi Quick Reference Guide*, p/n 70-33849-xx
- ◆ *LS 4000 Series Product Reference Guide*, p/n 70-16171-xx
- ◆ *LS 4000 Series Quick Reference Guide*, p/n 70-16423-xx.



Service Information

If you have a problem with your equipment, contact the [Symbol Support Center](#) for your region. See below for contact information. Before calling, have the model number, serial number, and several of your bar code symbols at hand.

Call the Support Center from a phone near the scanning equipment so that the service person can try to talk you through your problem. If the equipment is found to be working properly and the problem is symbol readability, the Support Center will request samples of your bar codes for analysis at our plant.

If your problem cannot be solved over the phone, you may need to return your equipment for servicing. If that is necessary, you will be given specific directions.

Note: *Symbol Technologies is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact Symbol to have another sent to you.*

Symbol Support Center

In the U.S.A., for service information, warranty information or technical assistance, call:

SYMBOL SUPPORT CENTER 1-800-653-5350	Europe/Mid-East Distributor Operations Contact your local distributor or call +44 118 945 7360
Canada Mississauga, Ontario Canadian Headquarters (905) 629-7226	Asia Singapore Symbol Technologies Asia, Inc. 337-6588 (Inside Singapore) +65-337-6588 (Outside Singapore)

If you purchased your Symbol product from a Symbol Business Partner, contact that Business Partner for service.

Warranty

Symbol Technologies, Inc (“Symbol”) manufactures its hardware products in accordance with industry-standard practices. Symbol warrants that for a period of twelve (12) months from date of shipment, products will be free from defects in materials and workmanship.

This warranty is provided to the original owner only and is not transferable to any third party. It shall not apply to any product (i) which has been repaired or altered unless done or approved by Symbol, (ii) which has not been maintained in accordance with any operating or handling instructions supplied by Symbol, (iii) which has been subjected to unusual physical or electrical stress, misuse, abuse, power shortage, negligence or accident or (iv) which has been used other than in accordance with the product operating and handling instructions. Preventive maintenance is the responsibility of customer and is not covered under this warranty.

Wear items and accessories having a Symbol serial number, will carry a 90-day limited warranty. Non-serialized items will carry a 30-day limited warranty.

Warranty Coverage and Procedure

During the warranty period, Symbol will repair or replace defective products returned to Symbol’s manufacturing plant in the US. For warranty service in North America, call the Symbol Support Center at 1-800-653-5350. International customers should contact the local Symbol office or support center. If warranty service is required, Symbol will issue a Return Material Authorization Number. Products must be shipped in the original or comparable packaging, shipping and insurance charges prepaid. Symbol will ship the repaired or replacement product freight and insurance prepaid in North America. Shipments from the US or other locations will be made F.O.B. Symbol’s manufacturing plant.

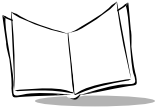
Symbol will use new or refurbished parts at its discretion and will own all parts removed from repaired products. Customer will pay for the replacement product in case it does not return the replaced product to Symbol within 3 days of receipt of the replacement product. The process for return and customer’s charges will be in accordance with Symbol’s Exchange Policy in effect at the time of the exchange.

Customer accepts full responsibility for its software and data including the appropriate backup thereof. Repair or replacement of a product during warranty will not extend the original warranty term.

Symbol’s Customer Service organization offers an array of service plans, such as on-site, depot, or phone support, that can be implemented to meet customer’s special operational requirements and are available at a substantial discount during warranty period.

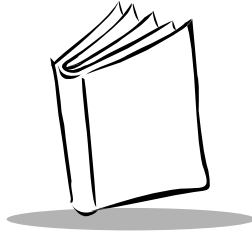
General

Except for the warranties stated above, Symbol disclaims all warranties, express or implied, on products furnished hereunder, including without limitation implied warranties of merchantability and fitness for a particular purpose. The stated express warranties are in lieu of all obligations or liabilities on part of Symbol for damages, including without limitation, special, indirect, or consequential damages arising out of or in connection with the use or performance of the product.



Seller's liability for damages to buyer or others resulting from the use of any product, shall in no way exceed the purchase price of said product, except in instances of injury to persons or property.

Some states (or jurisdictions) do not allow the exclusion or limitation of incidental or consequential damages, so the preceding exclusion or limitation may not apply to you.



Chapter 1

Advanced Data Formatting

Introduction

Advanced Data Formatting (ADF) is a means of customizing data before transmission to your host device. Scan data can be edited to suit your particular requirements.

ADF can be implemented through scanning a related series of bar codes, which appear in Chapter 2, *ADF Bar Codes*.

Rules: Criteria Linked to Actions

In ADF, data is customized through **rules**. These rules perform detailed actions when the data meets certain criteria. One rule may consist of single or multiple criteria applied to single or multiple actions.

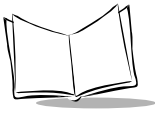
For instance, a data formatting rule could be the following:

Criteria: *When scan data is Code 39, length 12, and data at the start position is the string "129",*

Actions: *pad all sends with zeros to length 8,*
send all data up to X,
send a space.

If a Code 39 bar code of 1299X1559828 is scanned, the following is transmitted: 00001299<space>. If a Code 39 bar code of 1299X15598 is scanned, this rule is ignored.

The rule specifies the editing conditions and requirements before data transmission occurs.



Using ADF Bar Codes

When you program a rule, make sure the rule is logically correct. Plan ahead before you start scanning.

To program each data formatting rule:

- ◆ **Start the Rule.** Scan the **BEGIN NEW RULE** bar code on page 2-1.
- ◆ **Criteria.** Scan the bar codes for all pertinent criteria. Criteria can include code type (e.g., Code 128), code length, or data that contains a specific character string (e.g., the digits "129"). These options are described in *Criteria* on page 1-3.
- ◆ **Actions.** Scan all actions related to, or affecting, these criteria. The actions of a rule specify how to format the data for transmission. These options are described in *Actions* on page 1-4.
- ◆ **Save the Rule.** Scan the **SAVE RULE** bar code on page 2-1. This places the rule in the "top" position in the rule buffer.
- ◆ If you make errors during this process, some special-purpose bar codes may be useful: **Erase Criteria and Start Again, Erase Actions and Start Again, Erase Previously Saved Rule**, etc.

Criteria, actions, and entire rules may be erased by scanning the appropriate bar code (see page 2-2).

Beeper Definitions on page 1-11 help guide you through the programming steps.

Special Commands

Begin New Rule

Scan this bar code first when programming a data formatting rule.

Save Rule

Scan this bar code to complete a data formatting rule.

Erase

Use these bar codes to erase criteria, actions, and rules.

Quit Entering Rules

Scan this bar code to quit entering rules.

Disable Rule Set

These bar codes allow you to disable particular rule sets.

Criteria

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 Lengths

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 affects data that begins with a specific character or data string, or contains a specific character or data string.

Specific String at Start

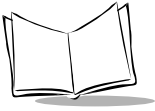
Scan this bar code, then scan the bar codes representing the desired character or characters (up to a total of 8) in the *Alphanumeric Keyboard* on page 2-66.

Specific String, Any Location

Scan this bar code, then, using the *Numeric Keypad* on page 2-11, 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* on page 2-66, followed by the **END OF MESSAGE** bar code on page 2-72.

Any Message OK

By not scanning any bar code, all selected code types are formatted, regardless of information contained.



Rule Belongs To Set

Select the set a rule belongs to.

Actions

Select how to format the data for transmission.

Send Data

Send all data that remains, send all data up to a specific character selected from the *Alphanumeric Keyboard*, or send the next N characters. N = any number from 1 to 254, selected from the *Alphanumeric Keyboard*.

Setup Field(s)

Define fields as follows:

Move Cursor To a Character

Scan the **MOVE CURSOR TO CHARACTER** bar code on page 2-16, then any printable ASCII character from the *Alphanumeric Keyboard*. When this is used, the cursor moves to the position after the matching character. If the character is not there, the rule fails and ADF tries the next rule.

Move Cursor to Start of Data

Scan this bar code to move cursor to the beginning of the data.

Move Cursor Past a Character

This parameter moves the cursor past all sequential occurrences of a selected character. Scan the **MOVE CURSOR PAST CHARACTER** bar code on page 2-16, then select a character from the *Alphanumeric Keyboard*. If the character is not there, the cursor does not move (i.e., has no effect).

Skip Ahead "N" Characters

Scan one of these bar codes to select the number of positions ahead you wish to move the cursor.

Skip Back “N” Characters

Scan one of these bar codes to select the number of positions back you wish to move the cursor.

Send Preset Value

Send Values 1 through 6 by scanning the appropriate bar code. These values must be set using the prefix/suffix values in Table A-1 on page A-2.

Value 1 = Scan Suffix

Value 2 = Scan Prefix

Modify Data

Modify data in the ways listed. The following actions work for all send commands that follow it within a rule. If you program *pad zeros to length 6, send next 3 characters, stop padding, send next 5 characters*, three zeros are added to the first send, and the next send is unaffected by the padding. These options do not apply to the **Send Keystroke** or **Send Preset Value** options.

Remove All Spaces

To remove all spaces in the send commands that follow, 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.

Stop Space Removal

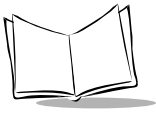
Scan this bar code to disable space removal.

Remove Leading Zeros

Scan this bar code to remove all leading zeros.

Stop Zero Removal

Scan this bar code to disable the removal of zeros.



Pad Data 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.

Pad Data 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.

Beeps

Select a beep sequence for each ADF rule.

Send Keystroke (Control Characters and Keyboard Characters)

Scan the "Send ___" bar code for the keystroke you wish to send.

Turn On/Off Rule Sets

Use these bar codes to turn rule sets on and off.

ADF Bar Code Menu Example

This section provides an example of how ADF rules are entered and used for scan data.

An auto parts distribution center wants to encode manufacturer ID, part number, and destination code into their own Code 128 bar codes. The distribution center also has products that carry UPC bar codes, placed there by the manufacturer. The Code 128 bar codes have the following format:

MMMMMPPPPDD

Where: M = Manufacturer ID

P = Part Number

D = Destination Code

The distribution center uses a PC with dedicated control characters for manufacturer ID <CTRL M>, part number <CTRL P>, and destination code <CTRL D>. At this center the UPC data is treated as manufacturer ID code.

The following rules need to be entered:

When scanning data of code type Code 128, send the next 5 characters, send the manufacturer ID key <CTRL M>, send the next 5 characters, send the part number key <CTRL P>, send the next 2 characters, send the destination code key <CTRL D>.

When scanning data of code type UPC/EAN, send all data, send the manufacturer ID key <CTRL M>.

To enter these rules, follow the steps below:

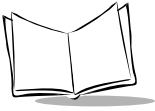
Rule 1: The Code 128 Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Begin New Rule	2-1	High High
2	Code 128	2-4	High High
3	Send next 5 characters	2-13	High High
4	Send <CTRL M>	2-33	High High
5	Send next 5 characters	2-13	High High
6	Send <CTRL P>	2-34	High High
7	Send next 2 characters	2-13	High High
8	Send <CTRL D>	2-32	High High
9	Save Rule	2-1	High Low High Low

Rule 2: The UPC Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Begin New Rule	2-1	High High
2	UPC/EAN	2-4	High High
3	Send all remaining data	2-13	High High
4	Send <CTRL M>	2-33	High High
5	Save Rule	2-1	High Low High Low

If you made any mistakes while entering this rule, scan the **QUIT ENTERING RULES** bar code on page 2-2. If you already saved the rule, scan the **ERASE PREVIOUSLY SAVED RULE** bar code on page 2-2.



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 rule programmer wants the cashier to scan the bar code “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 on page 2-3 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 2-3.

Rules Hierarchy (in Bar Codes)

The order of programming individual rules is important. The most general rule should be programmed last.

All programmed rules are stored in a buffer. As they are programmed, 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

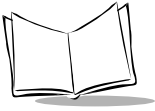
When data is scanned, the rules list is checked from top to bottom to determine if the criteria matches (and therefore, if the actions should occur). Input is modified into the data format specified by the first matching set of criteria it finds. Be sure that your most general rule is the last one programmed.

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 options are entered as ADF rules, and the hierarchy mentioned above also applies to them. For the LS 4800, this applies to prefix/suffix programming in the parameter *Scan Data Transmission Format*.

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 scan data. Units with custom software may have one or more default rules burned in. The rules hierarchy checks 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 scan data, send all data.

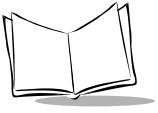
Since this rule always applies, ADF will never go into the default rules.

Beeper Definitions

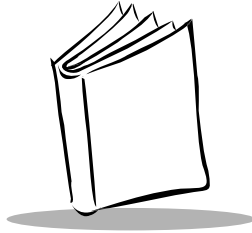
The following table defines beep sequences which occur during data entry.

Table 1-1. Beeper Definitions

Normal Data Entry. Duration of tones are short.	
Beeper Sequence	Indication
High-Low	Entry of a number is expected. Enter another digit. Add leading zeros to the front if necessary.
Low-Low	Entry of an alphabetic character is expected. Enter another character or scan the End of Message bar code.
High-High	Entry of Criterion/Action is expected. Enter another criterion or action, or scan the Save Rule bar code.
High-Low-High-Low	Rule saved. Rule entry mode exited.
High-Low-Low	All criteria or actions were cleared for rule currently being entered; continue entry of rule.
Low	Last saved rule was successfully deleted. The rule presently being entered is left intact.
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)
Error Indications. Duration of tones are very long.	
Beeper Sequence	Indication
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.)
Low-High-Low	Cancel rule entry. Rule entry mode exited because of an error or the user asked to exit rule entry.
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.



LS 4000 and LS 400Xi Series Advanced Programmer's Guide



Chapter 2

ADF Bar Codes

Special Commands

Begin New Rule

Scan this bar code to start entering a new rule.



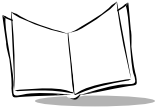
BEGIN NEW RULE

Save Rule

Scan this bar code to save the rule you entered.



SAVE RULE



Erase

Use these bar codes to erase criteria, actions, or rules.



ERASE CRITERIA
AND START
AGAIN



ERASE ACTIONS
AND START
AGAIN



ERASE PREVIOUSLY
SAVED RULE



ERASE ALL RULES

Quit Entering Rules

Scan this bar code to quit entering rules.



QUIT ENTERING
RULES

Disable Rule Set

Use these bar codes to disable rule sets.



DISABLE RULE SET 1



DISABLE RULE SET 2



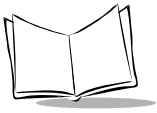
DISABLE RULE SET 3



DISABLE RULE SET 4



DISABLE ALL RULE SETS



Criteria

Code Types

Scan the bar codes for all code types desired before selecting other criteria.



CODE 39



CODABAR



CODE 128



D 2 OF 5



IATA 2 OF 5



I 2 OF 5



CODE 93



UPC-A



UPC-E



EAN-8

Code Types (Cont'd)



EAN-13



MSI PLESSEY



EAN 128



UPC-E1



BOOKLAND

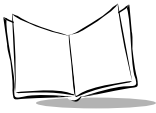


TRIOPTIC

Scan the bar code below **only** if you are using an LS 400Xi scanner which supports PDF417.



PDF417



Code Lengths

Scan these bar codes to define the number of characters the selected code types must contain. Select one length per rule only.

Note: *This is not a keypad.*



1



2



3



4



5



6



7



8

Code Lengths (Cont'd)



9



10



11



12



13



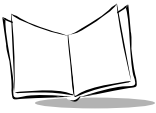
14



15



16



Code Lengths (Cont'd)



17



18



19



20



21



22



23



24

Code Lengths (Cont'd)



25



26



27



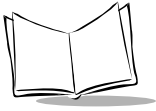
28



29



30



Specific Data String

After scanning the following bar code:

1. Enter a string using the *Alphanumeric Keyboard* beginning on page 2-66.
2. Scan **END OF MESSAGE** on page 2-72.



SPECIFIC STRING AT START

After scanning the following bar code:

1. Enter a location using the *Numeric Keypad* on page 2-11.
2. Enter a string using the *Alphanumeric Keyboard* beginning on page 2-66.
3. Scan **END OF MESSAGE** on page 2-72.



SPECIFIC STRING ANY LOCATION

Numeric Keypad

Bar codes on this page should not be confused with those on the alphanumeric keyboard.



0



1



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3



4



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7



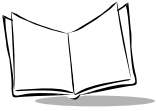
8



9



CANCEL



Rule Belongs To Set

Scan a bar code below to select which set a rule belongs to.



RULE BELONGS TO SET 1



RULE BELONGS TO SET 2



RULE BELONGS TO SET 3



RULE BELONGS TO SET 4

Actions

Send Data

Use these bar codes to send data.



SEND DATA UP TO
CHARACTER



SEND ALL DATA THAT
REMAINS



SEND NEXT CHARACTER



SEND NEXT
2 CHARACTERS



SEND NEXT
3 CHARACTERS



SEND NEXT
4 CHARACTERS



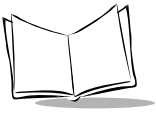
SEND NEXT
5 CHARACTERS



SEND NEXT
6 CHARACTERS



SEND NEXT
7 CHARACTERS



Send Data (Cont'd)



SEND NEXT
8
CHARACTERS



SEND NEXT
9
CHARACTERS



SEND NEXT
10
CHARACTERS



SEND NEXT
11
CHARACTERS



SEND NEXT
12
CHARACTERS



SEND NEXT
13
CHARACTERS



SEND NEXT
14
CHARACTERS



SEND NEXT
15
CHARACTERS



SEND NEXT
16
CHARACTERS



SEND NEXT
17
CHARACTERS

Send Data (Cont'd)



SEND NEXT
18 CHARACTERS



SEND NEXT
19 CHARACTERS



SEND NEXT
20 CHARACTERS

Scan the bar codes below **only** if you are using an
LS 400Xi scanner which supports PDF417.



SEND NEXT
50 CHARACTERS



SEND NEXT
100 CHARACTERS



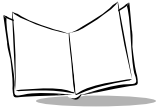
SEND NEXT
150 CHARACTERS



SEND NEXT
200 CHARACTERS



SEND NEXT
250 CHARACTERS



Setup Fields

Scan a bar code below to move the cursor in relation to a specified character. Then enter a character by scanning a bar code from the *Alphanumeric Keyboard* beginning on page 2-66.

Note: *If there is no match when the rule is interpreted and the rule fails, the next rule is checked.*



MOVE CURSOR TO
CHARACTER



MOVE CURSOR TO START



MOVE CURSOR PAST
CHARACTER



SEND PAUSE

Skip Ahead

Use the following bar codes to skip ahead characters.



SKIP AHEAD
1 CHARACTER



SKIP AHEAD
2 CHARACTERS



SKIP AHEAD
3 CHARACTERS



SKIP AHEAD
4 CHARACTERS



SKIP AHEAD
5 CHARACTERS



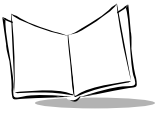
SKIP AHEAD
6 CHARACTERS



SKIP AHEAD
7 CHARACTERS



SKIP AHEAD
8 CHARACTERS



Skip Ahead (Cont'd)



SKIP AHEAD
9 CHARACTERS



SKIP AHEAD
10 CHARACTERS

Scan the bar codes below **only** if you are using an
LS 400Xi scanner which supports PDF417.



SKIP AHEAD
50 CHARACTERS



SKIP AHEAD
100 CHARACTERS



SKIP AHEAD
150 CHARACTERS



SKIP AHEAD
200 CHARACTERS



SKIP AHEAD
250 CHARACTERS

Skip Back

Use the following bar codes to skip back characters.



**SKIP BACK
1 CHARACTER**



**SKIP BACK
2 CHARACTERS**



**SKIP BACK
3 CHARACTERS**



**SKIP BACK
4 CHARACTERS**



**SKIP BACK
5 CHARACTERS**



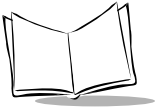
**SKIP BACK
6 CHARACTERS**



**SKIP BACK
7 CHARACTER**



**SKIP BACK
8 CHARACTERS**



Skip Back (Continued)



SKIP BACK
9 CHARACTERS



SKIP BACK
10 CHARACTERS

Scan the bar codes below **only** if you are using an LS 400Xi scanner which supports PDF417.



SKIP BACK
50 CHARACTERS



SKIP BACK
100 CHARACTERS



SKIP BACK
150 CHARACTERS



SKIP BACK
200 CHARACTERS



SKIP BACK
250 CHARACTERS

Send Preset Value

Use these bar codes to send preset values.



SEND VALUE 1



SEND VALUE 2



SEND VALUE 3



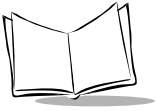
SEND VALUE 4



SEND VALUE 5



SEND VALUE 6



Modify Data

Use the bar codes below to modify data.



REMOVE ALL SPACES



CRUNCH ALL SPACES



STOP SPACE REMOVAL



**REMOVE LEADING
ZEROS**



STOP ZERO REMOVAL

Pad Data with Spaces

Use these bar codes to pad data with spaces.



**PAD SPACES TO
LENGTH 1**



**PAD SPACES TO
LENGTH 2**



**PAD SPACES TO
LENGTH 3**



**PAD SPACES TO
LENGTH 4**



**PAD SPACES TO
LENGTH 5**



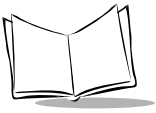
**PAD SPACES TO
LENGTH 6**



**PAD SPACES TO
LENGTH 7**



**PAD SPACES TO
LENGTH 8**



Pad Data with Spaces (Cont'd)



PAD SPACES TO
LENGTH 9



PAD SPACES TO
LENGTH 10



PAD SPACES TO
LENGTH 11



PAD SPACES TO
LENGTH 12



PAD SPACES TO
LENGTH 13



PAD SPACES TO
LENGTH 14



PAD SPACES TO
LENGTH 15



PAD SPACES TO
LENGTH 16

Pad Data with Spaces (Cont'd)



PAD SPACES TO
LENGTH 17



PAD SPACES TO
LENGTH 18



PAD SPACES TO
LENGTH 19



PAD SPACES TO
LENGTH 20



PAD SPACES TO
LENGTH 21



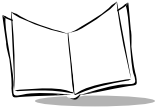
PAD SPACES TO
LENGTH 22



PAD SPACES TO
LENGTH 23



PAD SPACES TO
LENGTH 24



Pad Data with Spaces (Continued)



PAD SPACES TO
LENGTH 25



PAD SPACES TO
LENGTH 26



PAD SPACES TO
LENGTH 27



PAD SPACES TO
LENGTH 28



PAD SPACES TO
LENGTH 29



PAD SPACES TO
LENGTH 30



STOP PAD SPACES

Pad Data with Zeros

Use these bar codes to pad data with zeros.



PAD ZEROS TO
LENGTH 1



PAD ZEROS TO
LENGTH 2



PAD ZEROS TO
LENGTH 3



PAD ZEROS TO
LENGTH 4



PAD ZEROS TO
LENGTH 5



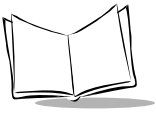
PAD ZEROS TO
LENGTH 6



PAD ZEROS TO
LENGTH 7



PAD ZEROS TO
LENGTH 8



Pad Data With Zeros (Cont'd)



PAD ZEROS TO
LENGTH 9



PAD ZEROS TO
LENGTH 10



PAD ZEROS TO
LENGTH 11



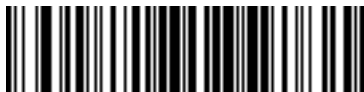
PAD ZEROS TO
LENGTH 12



PAD ZEROS TO
LENGTH 13



PAD ZEROS TO
LENGTH 14



PAD ZEROS TO
LENGTH 15



PAD ZEROS TO
LENGTH 16

Pad Data With Zeros (Cont'd)



PAD ZEROS TO
LENGTH 17



PAD ZEROS TO
LENGTH 18



PAD ZEROS TO
LENGTH 19



PAD ZEROS TO
LENGTH 20



PAD ZEROS TO
LENGTH 21



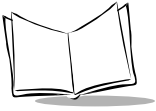
PAD ZEROS TO
LENGTH 22



PAD ZEROS TO
LENGTH 23



PAD ZEROS TO
LENGTH 24



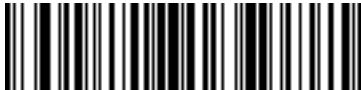
Pad Data With Zeros (Cont'd)



PAD ZEROS TO
LENGTH 25



PAD ZEROS TO
LENGTH 26



PAD ZEROS TO
LENGTH 27



PAD ZEROS TO
LENGTH 28



PAD ZEROS TO
LENGTH 29



PAD ZEROS TO
LENGTH 30



STOP PAD ZEROS

Beeps

Select one beep sequence per ADF rule.



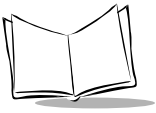
BEEP ONCE



BEEP TWICE



BEEP THREE TIMES



Control Characters

Scan these bar codes to send control characters.



SEND CONTROL 2



SEND CONTROL A



SEND CONTROL B



SEND CONTROL C



SEND CONTROL D



SEND CONTROL E



SEND CONTROL F



SEND CONTROL G

Control Characters (Cont'd)



SEND CONTROL H



SEND CONTROL I



SEND CONTROL J



SEND CONTROL K



SEND CONTROL L



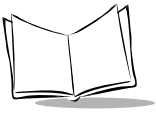
SEND CONTROL M



SEND CONTROL N



SEND CONTROL O



Control Characters (Cont'd)



SEND CONTROL P



SEND CONTROL Q



SEND CONTROL R



SEND CONTROL S



SEND CONTROL T



SEND CONTROL U



SEND CONTROL V



SEND CONTROL W

Control Characters (Cont'd)



SEND CONTROL X



SEND CONTROL Y



SEND CONTROL Z



SEND CONTROL [



SEND CONTROL \



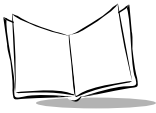
SEND CONTROL]



SEND CONTROL ^



SEND CONTROL _



Keyboard Characters

Use these bar codes to send keyboard characters.



SEND SPACE



SEND !



SEND "



SEND #



SEND \$



SEND %



SEND &



SEND '

Keyboard Characters (Cont'd)



SEND (



SEND)



SEND *



SEND +



SEND ,



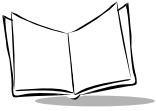
SEND -



SEND .



SEND /



Keyboard Characters (Cont'd)



SEND 0



SEND 1



SEND 2



SEND 3



SEND 4



SEND 5



SEND 6



SEND 7

Keyboard Characters (Cont'd)



SEND 8



SEND 9



SEND :



SEND ;



SEND <



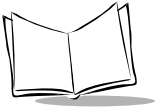
SEND =



SEND >



SEND ?



Keyboard Characters (Cont'd)



SEND @



SEND A



SEND B



SEND C



SEND D



SEND E



SEND F



SEND G

Keyboard Characters (Cont'd)



SEND H



SEND I



SEND J



SEND K



SEND L



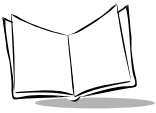
SEND M



SEND N



SEND O



Keyboard Characters (Cont'd)



SEND P



SEND Q



SEND R



SEND S



SEND T



SEND U



SEND V



SEND W

Keyboard Characters (Cont'd)



SEND X



SEND Y



SEND Z



SEND [



SEND \



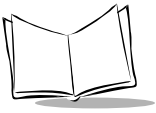
SEND]



SEND ^



SEND _



Keyboard Characters (Cont'd)



SEND '



SEND a



SEND b



SEND c



SEND d



SEND e



SEND f



SEND g

Keyboard Characters (Cont'd)



SEND h



SEND i



SEND j



SEND k



SEND l



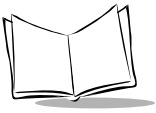
SEND m



SEND n



SEND o



Keyboard Characters (Cont'd)



SEND p



SEND q



SEND r



SEND s



SEND t



SEND u



SEND v



SEND w

Keyboard Characters (Cont'd)



SEND x



SEND y



SEND z



SEND {



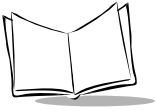
SEND |



SEND }



SEND ~



Send ALT Characters



SEND ALT 2



SEND ALT A



SEND ALT B



SEND ALT C



SEND ALT D



SEND ALT E



SEND ALT F



SEND ALT G

Send ALT Characters (Cont'd)



SEND ALT H



SEND ALT I



SEND ALT J



SEND ALT K



SEND ALT L



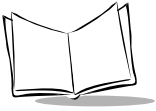
SEND ALT M



SEND ALT N



SEND ALT O



Send ALT Characters (Cont'd)



SEND ALT P



SEND ALT Q



SEND ALT R



SEND ALT S



SEND ALT T



SEND ALT U



SEND ALT V



SEND ALT W

Send ALT Characters (Cont'd)



SEND ALT X



SEND ALT Y



SEND ALT Z



SEND ALT [



SEND ALT \



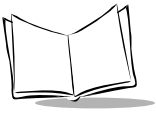
SEND ALT]



SEND ALT 6



SEND ALT -



Send Command Characters



SEND PA 1



SEND PA 2



SEND CMD 1



SEND CMD 2



SEND CMD 3



SEND CMD 4

Send Command Characters (Cont'd)



SEND CMD 5



SEND CMD 6



SEND CMD 7



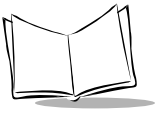
SEND CMD 8



SEND CMD 9



SEND CMD 10



Send Special Characters



SEND YEN
CHARACTER



SEND POUND STERLING
CHARACTER



SEND BOMB
CHARACTER



SEND HOOK
CHARACTER



SEND BULLET
CHARACTER



SEND 1/2
CHARACTER



SEND PARAGRAPH
CHARACTER



SEND SECTION
CHARACTER



SEND VERTICAL
CHARACTER

Send Keypad Characters



SEND KEYPAD *



SEND KEYPAD +



SEND KEYPAD -



SEND KEYPAD .



SEND KEYPAD /



SEND KEYPAD 0



SEND KEYPAD 1



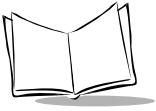
SEND KEYPAD 2



SEND KEYPAD 3



SEND KEYPAD 4



Send Keypad Characters (Cont'd)



SEND KEYPAD 5



SEND KEYPAD 6



SEND KEYPAD 7



SEND KEYPAD 8



SEND KEYPAD 9



SEND KEYPAD ENTER



**SEND KEYPAD
NUM LOCK**

Send Keypad Characters (Cont'd)



SEND BREAK KEY



SEND DELETE KEY



SEND PAGE UP KEY



SEND END KEY



SEND PAGE DOWN
KEY



SEND PAUSE KEY



SEND SCROLL LOCK
KEY



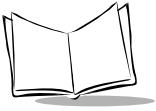
SEND BACKSPACE
KEY



SEND TAB KEY



SEND PRINT SCREEN
KEY



Send Keypad Characters (Cont'd)



SEND INSERT KEY



SEND HOME KEY



SEND ENTER KEY



SEND ESCAPE KEY



SEND UP ARROW
KEY



SEND DOWN ARROW
KEY



SEND LEFT ARROW
KEY



SEND RIGHT ARROW
KEY



SEND BACK TAB
CHARACTER

Send Function Key



SEND F1 KEY



SEND F2 KEY



SEND F3 KEY



SEND F4 KEY



SEND F5 KEY



SEND F6 KEY



SEND F7 KEY



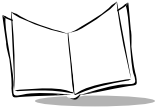
SEND F8 KEY



SEND F9 KEY



SEND F10 KEY



Send Function Key (Cont'd)



SEND F11 KEY



SEND F12 KEY



SEND F13 KEY



SEND F14 KEY



SEND F15 KEY



SEND F16 KEY



SEND F17 KEY



SEND F18 KEY



SEND F19 KEY



SEND F20 KEY

Send Function Key (Cont'd)



SEND F21 KEY



SEND F22 KEY



SEND F23 KEY



SEND F24 KEY



SEND F25 KEY



SEND F26 KEY



SEND F27 KEY



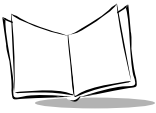
SEND F28 KEY



SEND F29 KEY



SEND F30 KEY



Send Function Key (Cont'd)



SEND PF1 KEY



SEND PF2 KEY



SEND PF3 KEY



SEND PF4 KEY



SEND PF5 KEY



SEND PF6 KEY



SEND PF7 KEY



SEND PF8 KEY



SEND PF9 KEY



SEND PF10 KEY

Send Function Key (Cont'd)



SEND PF11 KEY



SEND PF12 KEY



SEND PF13 KEY



SEND PF14 KEY



SEND PF15 KEY



SEND PF16 KEY



SEND PF17 KEY



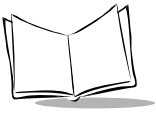
SEND PF18 KEY



SEND PF19 KEY



SEND PF20 KEY



Send Function Key (Cont'd)



SEND PF21 KEY



SEND PF22 KEY



SEND PF23 KEY



SEND PF24 KEY



SEND PF25 KEY



SEND PF26 KEY



SEND PF27 KEY



SEND PF28 KEY



SEND PF29 KEY



SEND PF30 KEY

Turn On/Off Rule Set

Use these bar codes to turn rule sets on and off.



TURN ON RULE SET 1



TURN ON RULE SET 2



TURN ON RULE SET 3



TURN ON RULE SET 4



TURN OFF RULE SET 1



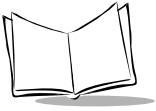
TURN OFF RULE SET 2



TURN OFF RULE SET 3



TURN OFF RULE SET 4



Alphanumeric Keyboard



SPACE



#



\$



%



*



+



-



.



/



!

Alphanumeric Keyboard (Continued)



“



&



'



(



)



:



;



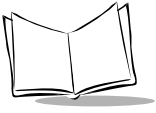
<



=



>



Alphanumeric Keyboard (Continued)



?



@



[



\



]



^



-



~

Alphanumeric Keyboard (Continued)

Bar codes on this page should not be confused with those on the numeric keypad.



0



1



2



3



4



5



6



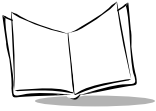
7



8



9



Alphanumeric Keyboard (Continued)



A



B



C



D



E



F



G



H



I



J

Alphanumeric Keyboard (Continued)



K



L



M



N



O



P



Q



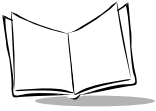
R



S



T



Alphanumeric Keyboard (Continued)



U



V



W



X



Y



Z



CANCEL



END OF MESSAGE

Alphanumeric Keyboard (Continued)



a



b



c



d



e



f



g



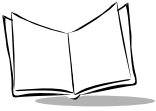
h



i



j



Alphanumeric Keyboard (Continued)



k



l



m



n



o



p



q



r



s



t

Alphanumeric Keyboard (Continued)



u



v



w



x



y



z



{



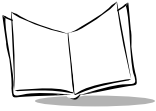
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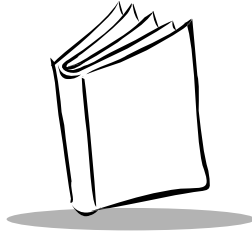
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LS 4000 and LS 400Xi Series Advanced Programmer's Guide



Appendix A

ASCII Tables and Keyboard Layouts

Prefix / Suffix Values

The following values can be assigned as prefixes or suffixes for ASCII character data transmission. If you're using a keyboard interface, refer to the *Synapse "Smart Cable" Interface Guide* for keystroke prefix/suffix values.

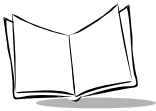
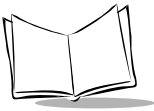


Table A-1. Prefix/Suffix Values

Prefix/Suffix Value	Full ASCII Code 39 Encode Char.	ASCII Character	Prefix/Suffix Value	Full ASCII Code 39 Encode Char.	ASCII Character
1000	%U	NUL	1030	%D	RS
1001	\$A	SOH	1031	%E	US
1002	\$B	STX	1032	Space	Space
1003	\$C	ETX	1033	/A	!
1004	\$D	EOT	1034	/B	"
1005	\$E	ENQ	1035	/C	#
1006	\$F	ACK	1036	/D	\$
1007	\$G	BELL	1037	/E	%
1008	\$H	BCKSPC	1038	/F	&
1009	\$I	HORIZ TAB	1039	/G	'
1010	\$J	LF/NW LN	1040	/H	(
1011	\$K	VT	1041	/I)
1012	\$L	FF	1042	/J	*
1013	\$M	CR/ENTER	1043	/K	+
1014	\$N	SO	1044	/L	,
1015	\$O	SI	1045	-	-
1016	\$P	DLE	1046	.	.
1017	\$Q	DC1	1047	/	/
1018	\$R	DC2	1048	0	0
1019	\$S	DC3	1049	1	1
1020	\$T	DC4	1050	2	2
1021	\$U	NAK	1051	3	3
1022	\$V	SYN	1052	4	4
1023	\$W	ETB	1053	5	5
1024	\$X	CAN	1054	6	6
1025	\$Y	EM	1057	7	7
1026	\$Z	SUB	1056	8	8
1027	%A	ESC	1057	9	9
1028	%B	FS	1058	/Z	:
1029	%C	GS	1059	%F	;

Table A-1. Prefix/Suffix Values (Cont'd)

Prefix/Suffix Value	Full ASCII Code 39 Encode Char.	ASCII Character	Prefix/Suffix Value	Full ASCII Code 39 Encode Char.	ASCII Character
1060	%G	<	1095	%O	–
1061	%H	=	1096	%W	`
1062	%I	>	1097	+A	a
1063	%J	?	1098	+B	b
1064	%V	@	1099	+C	c
1065	A	A	1100	+D	d
1066	B	B	1101	+E	e
1067	C	C	1102	+F	f
1068	D	D	1103	+G	g
1069	E	E	1104	+H	h
1070	F	F	1105	+I	i
1071	G	G	1106	+J	j
1072	H	H	1107	+K	k
1073	I	I	1108	+L	l
1074	J	J	1109	+M	m
1075	K	K	1110	+N	n
1076	L	L	1111	+O	o
1077	M	M	1112	+P	p
1078	N	N	1113	+Q	q
1079	O	O	1114	+R	r
1080	P	P	1115	+S	s
1081	Q	Q	1116	+T	t
1082	R	R	1117	+U	u
1083	S	S	1118	+V	v
1084	T	T	1119	+W	w
1085	U	U	1120	+X	x
1086	V	V	1121	+Y	y
1087	W	W	1122	+Z	z
1088	X	X	1123	%P	{
1089	Y	Y	1124	%Q	
1090	Z	Z	1125	%R	}
1091	%K	[1126	%S	~
1092	%L	\	1127		Undefined
1093	%M]			
1094	%N	^	7013		ENTER



ASCII Character Set

Table A-2. ASCII Character Set

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1000	%U	CTRL 2	1024	SX	CTRL X
1001	SA	CTRL A	1025	SY	CTRL Y
1002	SB	CTRL B	1026	SZ	CTRL Z
1003	SC	CTRL C	1027	%A	CTRL [
1004	SD	CTRL D	1028	%B	CTRL \
1005	SE	CTRL E	1029	%C	CTRL]
1006	SF	CTRL F	1030	%D	CTRL 6
1007	SG	CTRL G	1031	%E	CTRL -
1008	SH	CTRL H	1032	Space	Space
1009	SI	CTRL I	1033	/A	!
1010	SJ	CTRL J	1034	/B	'
1011	SK	CTRL K	1035	/C	#
1012	SL	CTRL L	1036	/D	\$
1013	SM	CTRL M	1037	/E	%
1014	SN	CTRL N	1038	/F	&
1015	SO	CTRL O	1039	/G	'
1016	SP	CTRL P	1040	/H	(
1017	SQ	CTRL Q	1041	/I)
1018	SR	CTRL R	1042	/J	*
1019	SS	CTRL S	1043	/K	+
1020	ST	CTRL T	1044	/L	,
1021	SU	CTRL U	1045	-	-
1022	SV	CTRL V	1046	.	.
1023	SW	CTRL W	1047	/	/
1048	0	0	1073	I	I

Table A-2. ASCII Character Set (Cont'd)

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1049	1	1	1074	J	J
1050	2	2	1075	K	K
1051	3	3	1076	L	L
1052	4	4	1077	M	M
1053	5	5	1078	N	N
1054	6	6	1079	O	O
1055	7	7	1080	P	P
1056	8	8	1081	Q	Q
1057	9	9	1082	R	R
1058	/Z	:	1083	S	S
1059	%F	;	1084	T	T
1060	%G	<	1085	U	U
1061	%H	=	1086	V	V
1062	%I	>	1087	W	W
1063	%J	?	1088	X	X
1064	%V	@	1089	Y	Y
1065	A	A	1090	Z	Z
1066	B	B	1091	%K	[
1067	C	C	1092	%L	\
1068	D	D	1093	%M]
1069	E	E	1094	%N	^
1070	F	F	1095	%O	_
1071	G	G	1096	%W	'
1072	H	H	1097	+A	a
1098	+B	b	1113	+Q	q
1099	+C	c	1114	+R	r
1100	+D	d	1115	+S	s

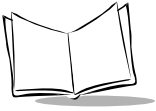


Table A-2. ASCII Character Set (Cont'd)

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1101	+E	e	1116	+T	t
1102	+F	f	1117	+U	u
1103	+G	g	1118	+V	v
1104	+H	h	1119	+W	w
1105	+I	i	1120	+X	x
1106	+J	j	1121	+Y	y
1107	+K	k	1122	+Z	z
1108	+L	l	1123	%P	{
1109	+M	m	1124	%Q	
1110	+N	n	1125	%R	}
1111	+O	o	1126	%S	~
1112	+P	p	1127		Undefined

Table A-2. ASCII Character Set (Cont'd)

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
ALT Keys	Keystroke	ALT Keys	Keystroke	ALT Keys	Keystroke
2064	ALT 2	2075	ALT K	2086	ALT V
2065	ALT A	2076	ALT L	2087	ALT W
2066	ALT B	2077	ALT M	2088	ALT X
2067	ALT C	2078	ALT N	2089	ALT Y
2068	ALT D	2079	ALT O	2090	ALT Z
2069	ALT E	2080	ALT P	2091	ALT [
2070	ALT F	2081	ALT Q	2092	ALT \
2071	ALT G	2082	ALT R	2093	ALT]
2072	ALT H	2083	ALT S	2094	ALT 6
2073	ALT I	2084	ALT T	2095	ALT -
2074	ALT J	2085	ALT U		
Misc. Key	Keystroke	Misc. Key	Keystroke	Misc. Key	Keystroke
3001	PA 1	3009	CMD 7	3017	°
3002	PA 2	3010	CMD 8	3018	1/2
3003	CMD 1	3011	CMD 9	3019	¶
3004	CMD 2	3012	CMD 10	3020	§
3005	CMD 3	3013	¥	3021	
3006	CMD 4	3014	£	3022	0/00
3007	CMD 5	3015	¤		
3008	CMD 6	3016	¬		

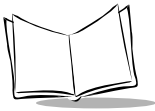
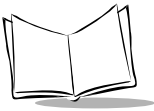


Table A-2. ASCII Character Set (Cont'd)

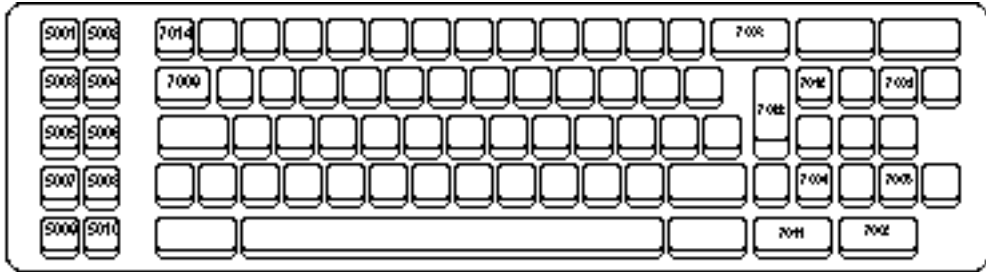
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PF Keys	Keystroke	PF Keys	Keystroke	PF Keys	Keystroke
4001	PF 1	4009	PF 9	4017	PF 17
4002	PF 2	4010	PF 10	4018	PF 18
4003	PF 3	4011	PF 11	4019	PF 19
4004	PF 4	4012	PF 12	4020	PF 20
4005	PF 5	4013	PF 13	4021	PF 21
4006	PF 6	4014	PF 14	4022	PF 22
4007	PF 7	4015	PF 15	4023	PF 23
4008	PF 8	4016	PF 16	4024	PF 24
F Keys	Keystroke	F Keys	Keystroke	F Keys	Keystroke
5001	F 1	5014	F 14	5027	F 27
5002	F 2	5015	F 15	5028	F 28
5003	F 3	5016	F 16	5029	F 29
5004	F 4	5017	F 17	5030	F 30
5005	F 5	5018	F 18	5031	F 31
5006	F 6	5019	F 19	5032	F 32
5007	F 7	5020	F 20	5033	F 33
5008	F 8	5021	F 21	5034	F 34
5009	F 9	5022	F 22	5035	F 35
5010	F 10	5023	F 23	5036	F 36
5011	F 11	5024	F 24	5037	F 37
5012	F 12	5025	F 25	5038	F 38
5013	F 13	5026	F 26	5039	F 39

Table A-2. ASCII Character Set (Cont'd)

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
Numeric Keypad	Keystroke	Numeric Keypad	Keystroke	Numeric Keypad	Keystroke
6042	*	6049	1	6056	8
6043	+	6050	2	6057	9
6044	Undefined	6051	3	6058	Enter
6045	-	6062	4	6059	Num Lock
6046	.	6063	5	6060	00
6047	/	6064	6		
6048	0	6065	7		
Extended Keypad	Keystroke	Extended Keypad	Keystroke	Extended Keypad	Keystroke
7001	Break	7008	Backspace	7015	Up Arrow
7002	Delete	7009	Tab	7016	Dn Arrow
7003	Pg Up	7010	Print Screen	7017	Left Arrow
7004	End	7011	Insert	7018	Right Arrow
7005	Pg Dn	7012	Home	7019	Back Tab
7006	Pause	7013	Enter		
7007	Scroll Lock	7014	Escape		



Keyboard Maps



IBM PC/XT

TANDY HD 1200

ITT PC

NCR PC4

ADDS PC I/II

SPERRY PC

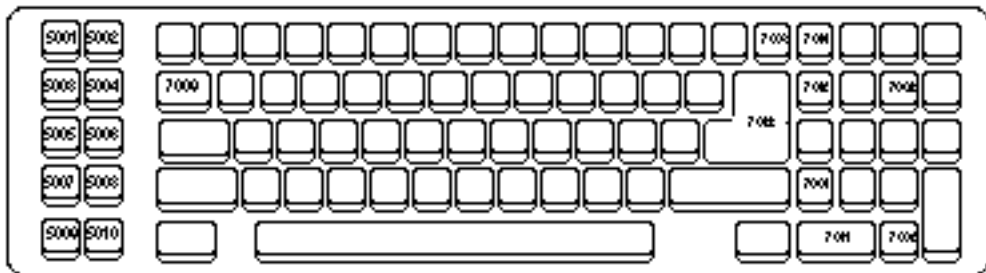
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LEADING EDGE PC

PITNEY BOWES A2000

COLUMBIA PC

HP VECTRA CS/RS

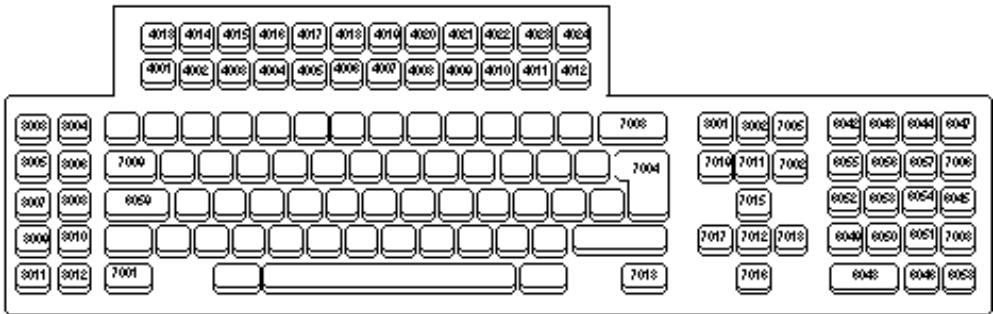


IBM PC/AT

NCR PC8

ZENITH 248

WYSE PC



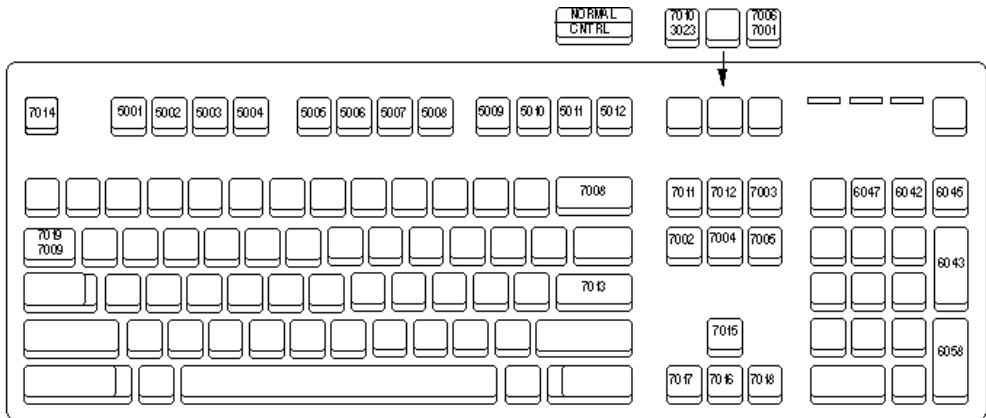
IBM 3179

IBM 3180

IBM 319X

IBM 347X

TELEX 122

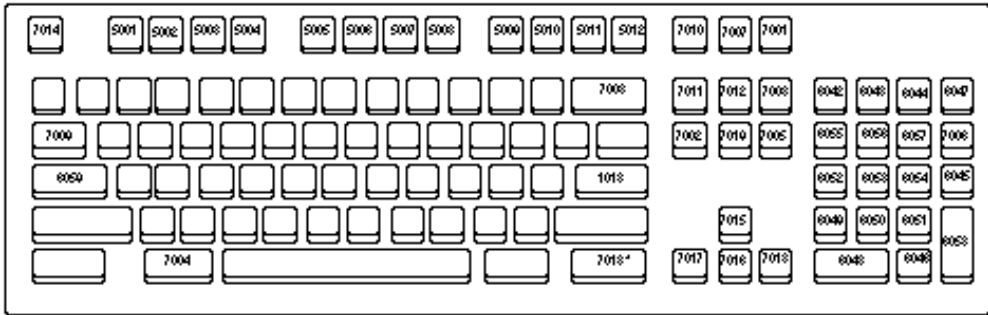
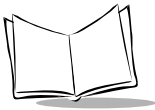


IBM PS2

COMPAQ 386

WYSE PC ENHANCED

HP VECTRA ES/QS

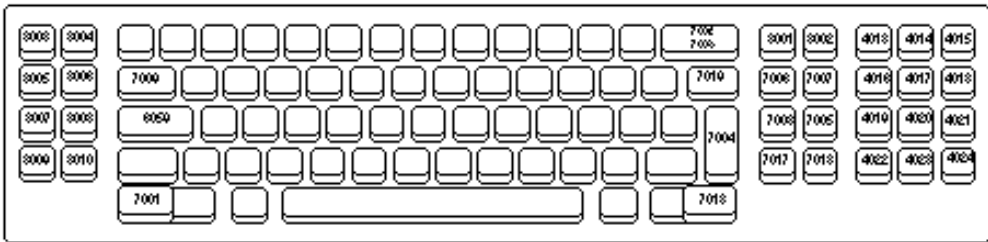


*3001 for IBM 3151

IBM 3151

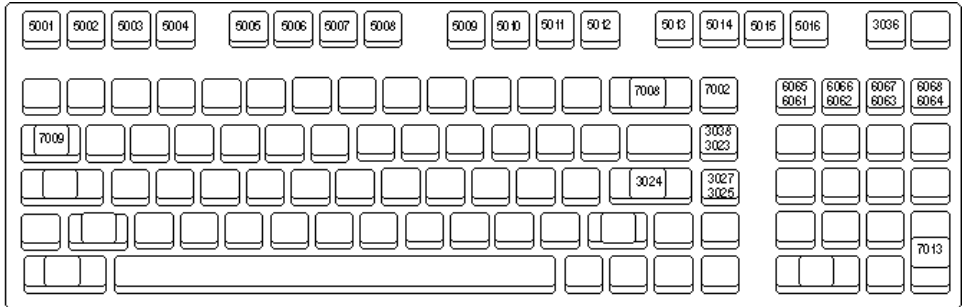
DEC VT2XX/VT3XX/VT4XX

IBM 316X

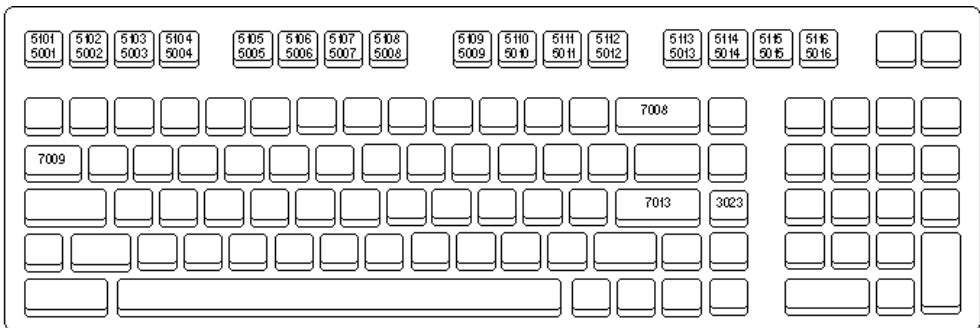


TEXAS INSTRUMENTS 924

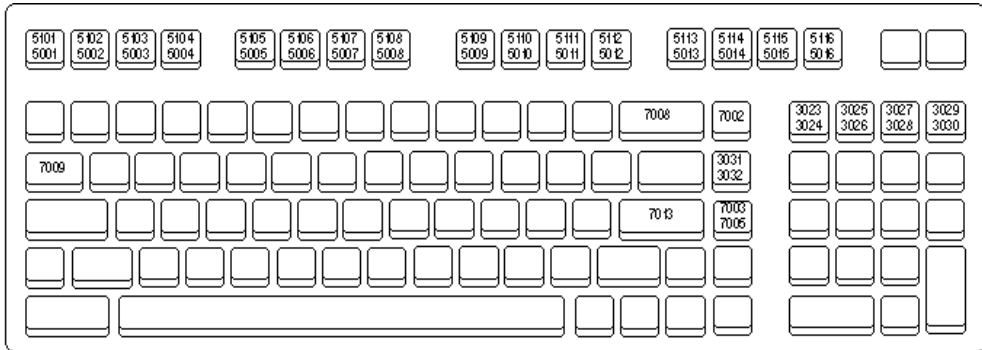
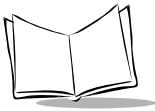
TELEX 88



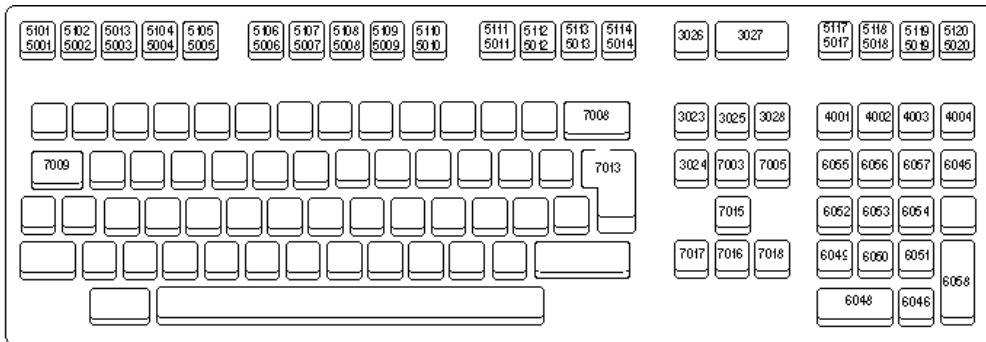
WYSE 50



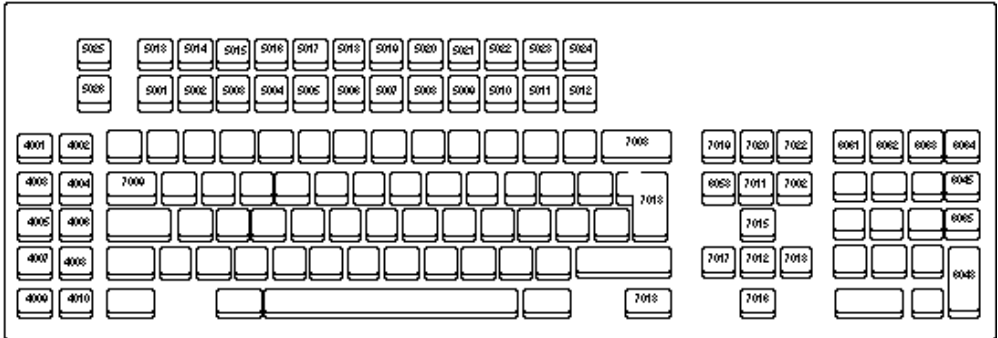
WYSE 60 ANSI KYBD



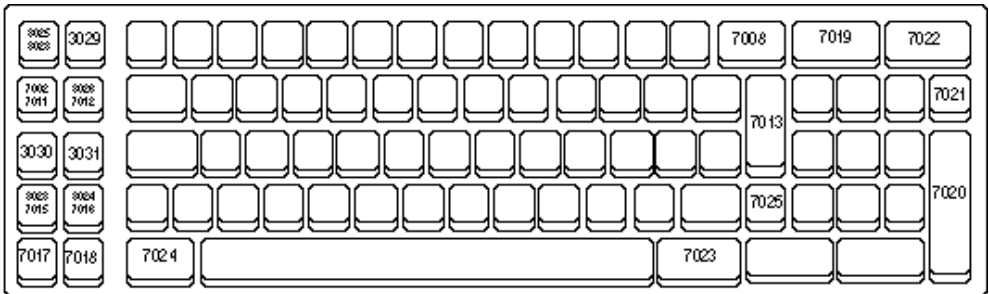
WYSE 60 ASCII KYBD



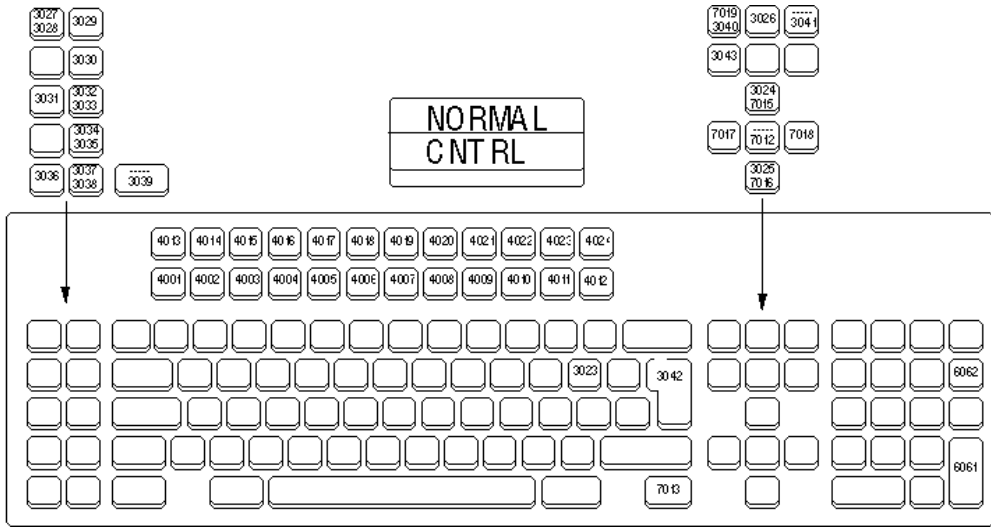
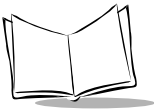
WYSE 60/85/150/185



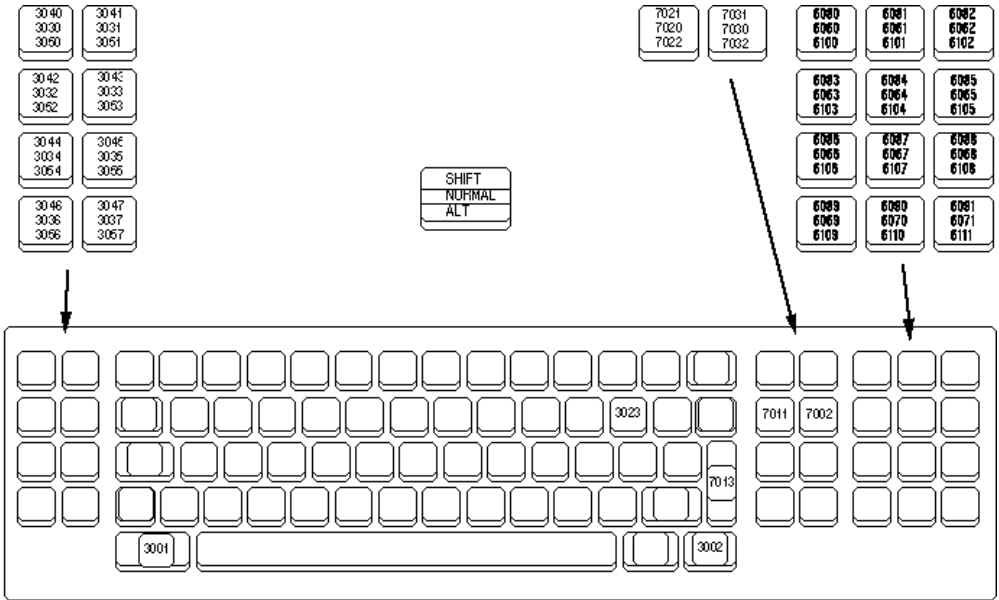
DECISION DATA 3496



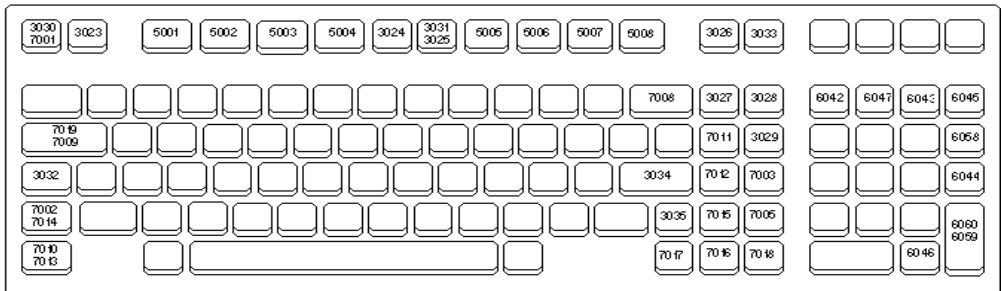
DECISION DATA 3761



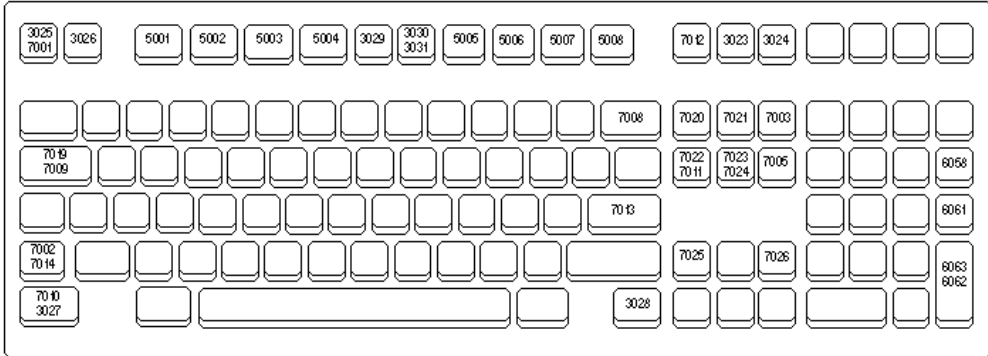
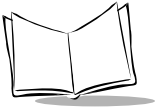
DECISION DATA 359X



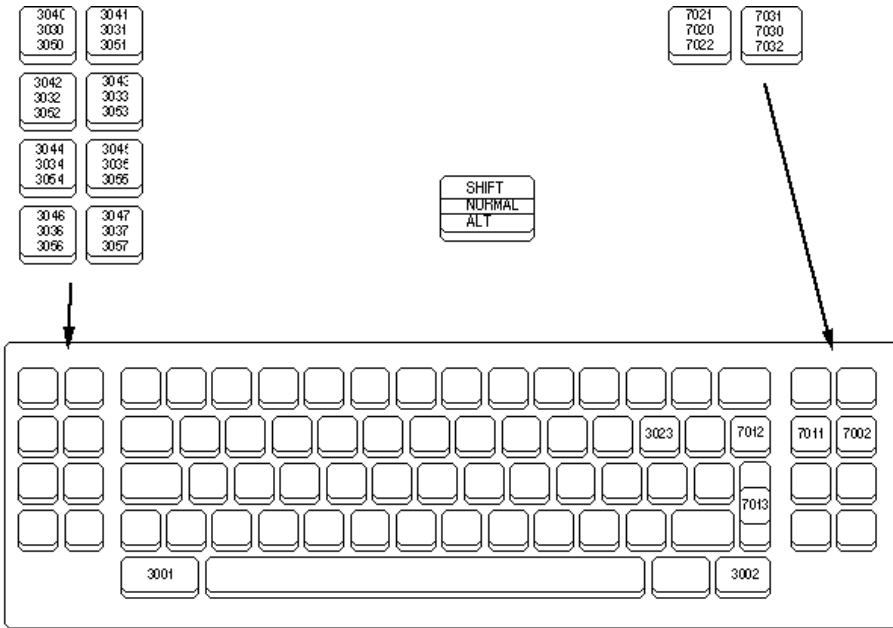
IBM 3178



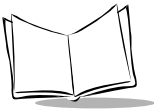
HP 239X



HP 700/9X



IBM 3278



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5002	5007					5014	5017
5003	5008					5015	5018
5004	5009					7013	5019
5005	5010						5020

NCR 2151

5001	5006		5007		5008	5011
5002					5009	5012
5003					5010	5013
5004					7013	5014
5005						5015

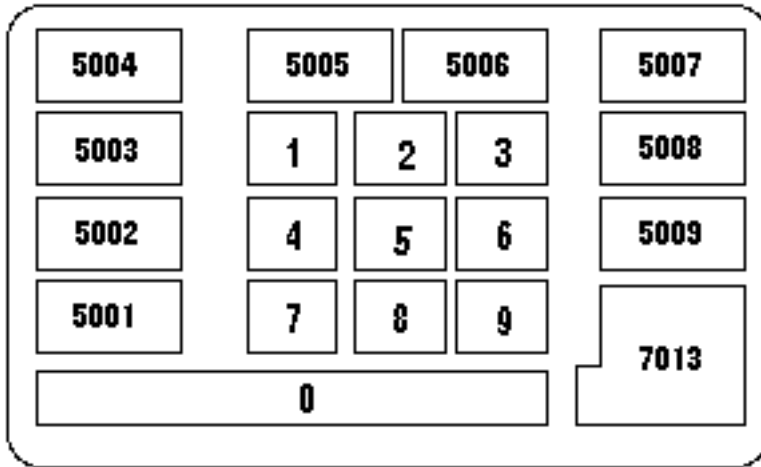
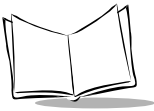
NCR 2152 27-KEY

500j	500k	501k	501l	502l	502m	502n	503n
500l	500m	501m	502l	502m	502n	502o	503o
500n	500o	501o					
500o	501j	501k					
500o	501j	501k					
500o	501j	501k					
500o	501j	501k			104k		
502o	502p	503p					
502p	502q	503q					
502p	503j	503k					
502p	503j	503k					
701k	503k						

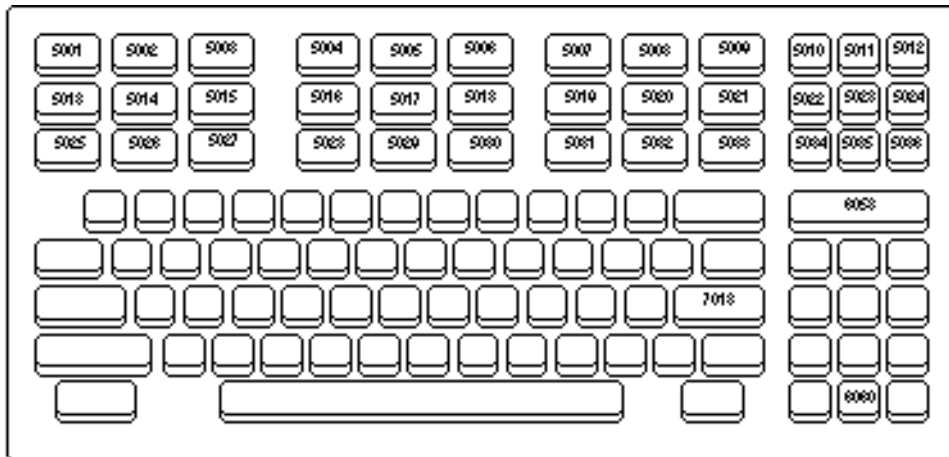
NCR 2155

500i	500k	500l	500m	500n	501i	501k	501l	501m	501n	502i	502k	502l	502m	502n	502i	502k	502l
500k	500m	500o	500p	501o	501k	501m	501n	502o	502k	502m	502o	502p	503o	502i	502k	502l	
502k													700k	502i	502k	502l	
															101k		
	700k													701o	701k		

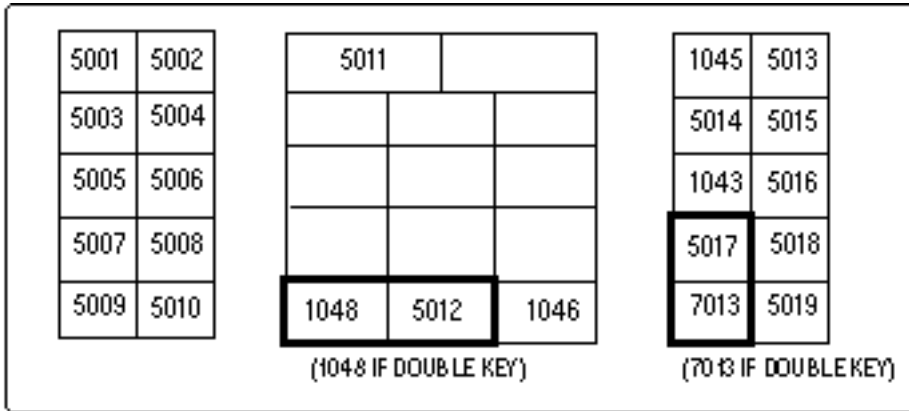
NCR 2157



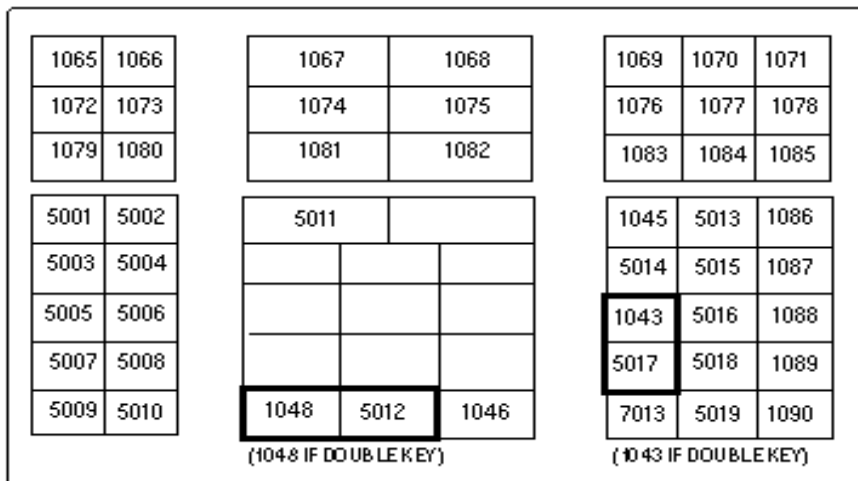
NCR 280



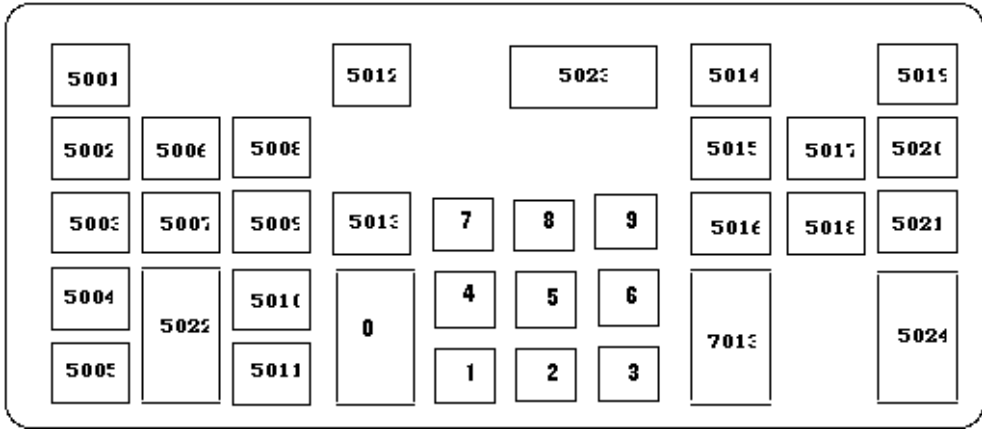
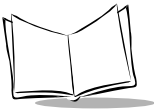
NCR 2950



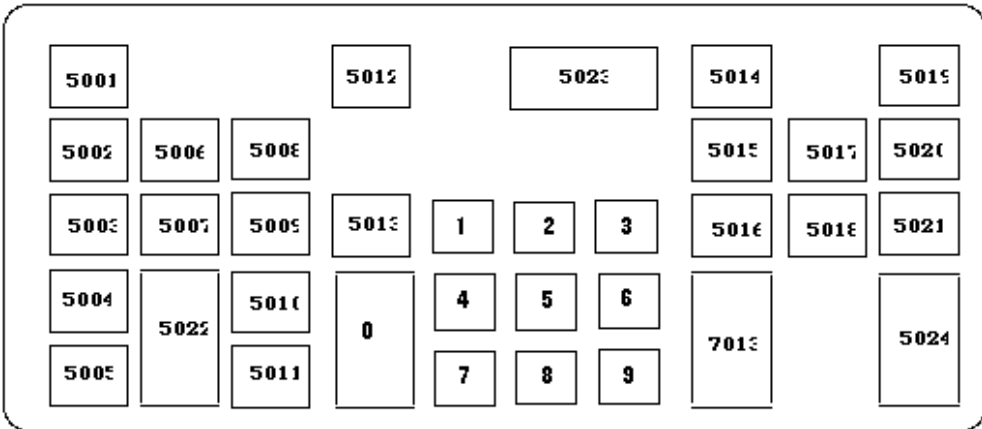
NCR 7052 32-KEY



NCR 7052 58-KEY



IBM 3683/3684 35-KEY Calculator Style



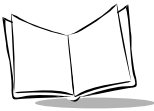
IBM 3683/3684 35-KEY Phone Style

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5003	5028	5007	5009	5013	4	5	6	5016	5018	5021
5004	5025	5022	5010	5033	1	2	3	7013	5026	5024
5005			5011	5034	0	.				

IBM 3683/3684 48-KEY Calculator Style

5001	5029	5030	5031	5012	5035	5036	5014	5037	5019	
5002	5027	5006	5008	5032	1	2	3	5015	5017	5020
5003	5028	5007	5009	5013	4	5	6	5016	5018	5021
5004	5025	5022	5010	5033	7	8	9	7013	5026	5024
5005			5011	5034	0	.				

IBM 3683/3684 48-KEY Phone Style

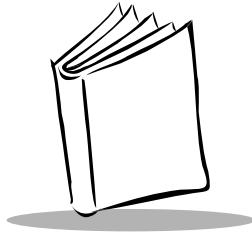


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5013	5040	5045	5060	5066	5062	5063	5074	5080	5086	5002	5012	5088	1	2	3	5016	5107	5021	5013
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5004	5042	5047	5062	5068	5064	5070	5076	5082	5088	5004	5017	5089	7	8	9	7013	5110	5011	5004
5005	5043	5048	5063	5069	5065	5071	5077	5083	5089	5005	5007	5084	0	*					5005

IBM 3683 116-KEY

		5008		5009		5010		5016
500	5004					5011	5014	5017
500:	5005	5020	1	2	3	5012	5015	5018
500:	5006	0	4	5	6	5013		5019
	5007		7	8	9			

IBM 3653 30-KEY



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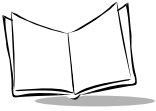
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