

GA27-3096-1  
File No. S370-09

**Systems**

**IBM 3767 Models 1 and 2  
Communication Terminal  
Component Description**

**IBM**

## Preface

This manual describes the IBM 3767 Communication Terminal, a multipurpose terminal that communicates with an IBM System/370. The information it contains is directed to customer executives, systems analysts, and systems engineers already aware of the operating procedures for the applications in which they plan to use the terminal.

The first chapter gives an overview of the 3767. It describes the applications and features of the 3767 and the communication facilities required. Chapters 2 and 3 describe the characteristics and features in detail.

The chapter on operating controls (Chapter 4) follows the chapters on operating characteristics and special features so that the reader can better appreciate the functions of these controls.

Detailed operating instructions are given in *IBM 3767 Communication Terminal Operator's Guide*, GA18-2000.

Instructions to guide the user in the setup of a terminal without the assistance of an IBM Customer Engineer are given in *IBM 3767 Communication Terminal Setup Instructions*, GC30-3026.

Information on installation and physical planning is given in *IBM Remote Multiplexers and Communications Terminals Installation Manual—Physical Planning*, GA27-3006.

*Second Edition* (November 1974)

This is a major revision of, and obsoletes, GA27-3096-0. Extensive changes have been made throughout the manual, and the user should review it in its entirety.

Changes are periodically made to the information herein; before using this publication in connection with the operation of IBM systems or equipment, refer to the latest *IBM System/360 and System/370 Bibliography*, GA22-6822, and associated Technical Newsletters for the editions that are applicable and current.

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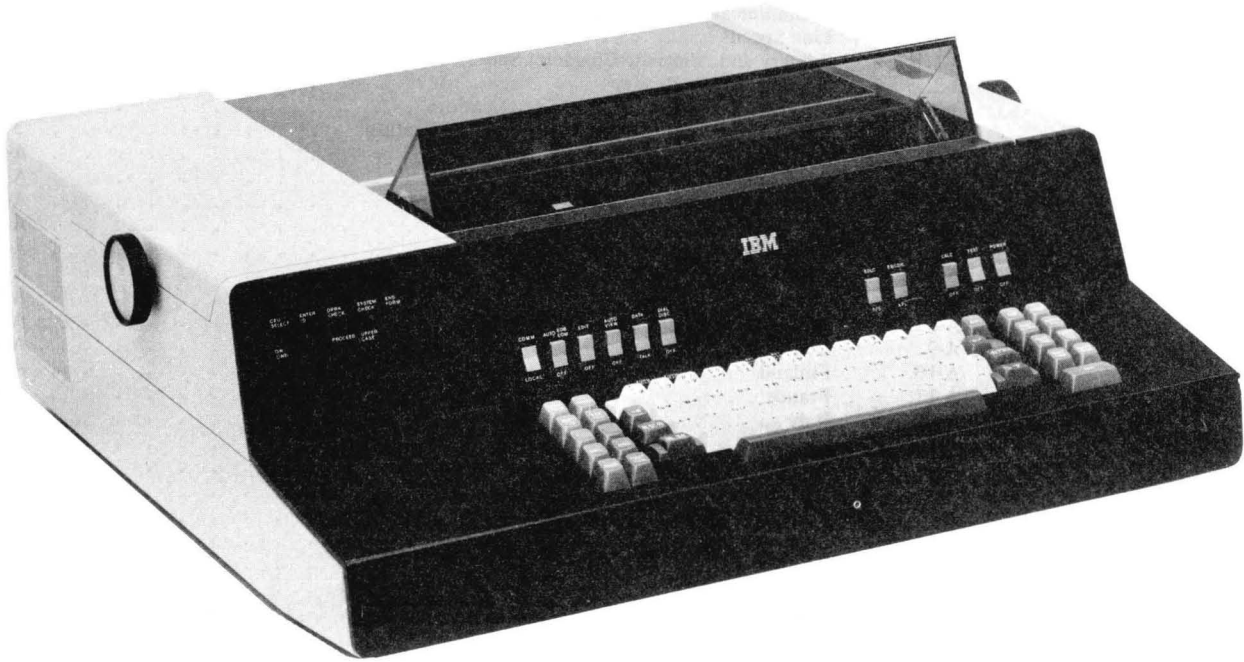
# Contents

<b>Chapter 1. Introduction</b> . . . . .	1-1 through 1-9
Applications . . . . .	1-4
Printer . . . . .	1-6
Forms . . . . .	1-6
Keyboard Character Sets and Transmission Codes . . . . .	1-6
Local Mode Operations (Offline) . . . . .	1-7
Communications Facilities . . . . .	1-7
SDLC (Basic or Buffered) or Start-Stop, Point-to-Point . . . . .	1-8
SDLC (Basic or Buffered) or Start-Stop Multipoint . . . . .	1-8
Modems . . . . .	1-8
Maintenance Aids . . . . .	1-8
Operator Test (Test Switch) . . . . .	1-9
<b>Chapter 2. Operating Characteristics</b> . . . . .	2-1 through 2-4
Modes of Operation . . . . .	2-1
Communicate Mode . . . . .	2-1
Local Mode . . . . .	2-3
Horizontal Formatting . . . . .	2-4
Terminal Identification and Addressing . . . . .	2-4
Terminal ID . . . . .	2-4
SNA Terminal Address . . . . .	2-4
<b>Chapter 3. Special Features</b> . . . . .	3-1 through 3-7
Start-Stop Features . . . . .	3-1
2740-1 Point-to-Point Line Control . . . . .	3-1
2740-1 Station Control Line Control . . . . .	3-1
2740-2 Line Control . . . . .	3-1
2741 Line Control . . . . .	3-1
1200 bps Integrated Modem . . . . .	3-2
1200 bps Integrated Modem/Interrupt . . . . .	3-2
Modem Interfaces . . . . .	3-2
Data Access Arrangement (DAA) . . . . .	3-2
Acoustic Coupler . . . . .	3-2
EIA/CCITT Interface . . . . .	3-2
Buffer With Edit (512 bytes) . . . . .	3-2
Buffer With Edit (1024 bytes) . . . . .	3-2
Alternate Character Set . . . . .	3-3
Vertical Form Control (VFC) . . . . .	3-3
Variable Width Forms Tractor . . . . .	3-3
Magnetic Stripe Reader . . . . .	3-4
Using the Magnetic Stripe Reader . . . . .	3-4
Transmission Characteristics . . . . .	3-5
Magnetic Code . . . . .	3-5
Magnetic Stripe Card Identification . . . . .	3-5
ASCII . . . . .	3-5
Calculate-Scientific . . . . .	3-6
Calculate Functions . . . . .	3-6
Entering Calculate Status . . . . .	3-6
Offline Calculation Characteristics . . . . .	3-6
Paper Roll Holder . . . . .	3-7
Security Keylock . . . . .	3-7
<b>Chapter 4. Operating Controls</b> . . . . .	4-1 through 4-11
3767 Lights, Switches Keyboard and Security Keylock . . . . .	4-1
Lights (Illustration) . . . . .	4-1
CPU Select . . . . .	4-2
Print Inhibit . . . . .	4-2
Operation Check . . . . .	4-2
System Check . . . . .	4-3
End of Form . . . . .	4-4

Data Set Ready	4-4
On Line	4-4
KANA	4-4
Proceed	4-4
Test	4-4
Upper Case	4-4
Weak Signal	4-4
Three-Position Column and Error Code Indicator (ANR)	4-5
Switches (Illustration)	4-5
Communicate/Local (Comm/Local) (Standard)	4-5
Auto (Standard)	4-5
Edit (Buffered SDLC)	4-6
Edit (2740-2)	4-6
Auto-View (Standard)	4-6
LF 2/1 (Double Space/Single Space) (Standard)	4-6
Data/Talk (Non-USA Only—Except Germany)	4-6
Dial Disc (Germany Only)	4-6
Line Speed	4-6
SDLC/SS (Start-Stop Feature)	4-6
Primary/Secondary (Alternate Character Set Feature)	4-6
Calculation (Calculate-Scientific Feature)	4-7
Test (Standard)	4-7
On/Off (Power) (Standard)	4-7
Security Keylock (Special Feature)	4-7
Keys (Illustration)	4-7
Form Feed (VFC Feature)	4-8
Vertical Tab (VFC Feature)	4-8
Cancel	4-8
Code	4-8
Index	4-8
System Request	4-8
Attention	4-9
Print View	4-9
Form Load	4-9
Form Ready	4-9
Vertical Format Set (VFC Feature)	4-9
Tab Set	4-9
Tab Clear	4-9
Left Margin Set	4-9
Right Margin Set	4-10
EOB (End of Block)	4-10
Print Buffer (Buffer Feature)	4-10
Print Line (Buffer Feature)	4-10
Print Character (Buffer Feature)	4-10
EOM (End of Message)	4-10
Reset	4-10
Buffer Return	4-11
Buffer Line Return (Buffer Feature)	4-11
Buffer Backspace	4-11
Chapter 5. Non-USA Considerations	5-1
Power Supply	5-1
Keyboard and Printer Requirements	5-1
Appendix A. Keyboard Layouts and Code Charts	A-1 through A-32
Keyboards	A-1
Code Charts	A-11
Appendix B. Terminal Identification and Address	B-1
SDLC Terminal Identification	B-1
Terminal ID	B-1
Terminal and Group Address	B-1
Appendix C. Glossary	C-1 through C-2
Index	X-1

# Figures

Frontispiece	IBM 3767 Communication Terminal . . . . .	vi
1-1.	Features and Accessories . . . . .	1-2
1-2.	3767 Features Related to 2740 and 2741 Start-Stop Line Control . . . . .	1-3
1-3.	Communications Facilities . . . . .	1-7
1-4.	Line Speeds . . . . .	1-8
3-1.	Primary and Alternate Character Sets . . . . .	3-3
3-2.	Magnetic Stripe Reader . . . . .	3-4
3-3.	Magnetic Stripe Reader Card Specifications . . . . .	3-5
3-4.	Key Arrangement for Calculate-Scientific Feature . . . . .	3-6
A-1.	ASCII . . . . .	A-1
A-2.	Correspondence (USA) . . . . .	A-1
A-3.	EBCDIC (Japan) . . . . .	A-2
A-4.	EBCDIC (USA) . . . . .	A-2
A-5.	International EBCDIC (World Trade) . . . . .	A-3
A-6.	Austria/Germany . . . . .	A-3
A-7.	Belgium . . . . .	A-4
A-8.	Brazil . . . . .	A-4
A-9.	Denmark . . . . .	A-5
A-10.	Finland . . . . .	A-5
A-11.	France . . . . .	A-6
A-12.	Italy . . . . .	A-6
A-13.	Katakana . . . . .	A-7
A-14.	Norway . . . . .	A-7
A-15.	Portugal . . . . .	A-8
A-16.	Spain . . . . .	A-8
A-17.	Spanish Speaking . . . . .	A-9
A-18.	Sweden . . . . .	A-9
A-19.	United Kingdom . . . . .	A-10
A-20.	Code Chart-APL . . . . .	A-12
A-21.	Code Chart-ASCII . . . . .	A-13
A-22.	Code Chart-World Trade Countries - APL . . . . .	A-14
A-23.	Code Chart-Correspondence . . . . .	A-15
A-24.	Code Chart-EBCDIC (USA) . . . . .	A-16
A-25.	Code Chart-EBCDIC (Japan) . . . . .	A-17
A-26.	Code Chart-International EBCDIC . . . . .	A-18
A-27.	Code Chart-Austria/Germany . . . . .	A-19
A-28.	Code Chart-Belgium . . . . .	A-20
A-29.	Code Chart-Brazil . . . . .	A-21
A-30.	Code Chart-Denmark . . . . .	A-22
A-31.	Code Chart-Finland . . . . .	A-23
A-32.	Code Chart-France . . . . .	A-24
A-33.	Code Chart-Italy . . . . .	A-25
A-34.	Code Chart-Katakana . . . . .	A-26
A-35.	Code Chart-Norway . . . . .	A-27
A-36.	Code Chart-Portugal . . . . .	A-28
A-37.	Code Chart-Spain . . . . .	A-29
A-38.	Code Chart-Spanish Speaking . . . . .	A-30
A-39.	Code Chart-Sweden . . . . .	A-31
A-40.	Code Chart-United Kingdom . . . . .	A-32



IBM 3767 Communication Terminal

## Chapter 1. Introduction

The IBM 3767 Communication Terminal is a compact, movable, desk-top terminal that is available in two models. The 3767 Model 1 prints at an average rate of 40 characters per second. The 3767 Model 2 prints at a maximum rate of 80 characters per second and has a 512-byte buffer. Buffer expansion features are available for both models.

The 3767 provides access to a remote CPU through SDLC (synchronous data link control) line control. SDLC is a new communications line control that increases functional capabilities. SDLC includes comprehensive detection and recovery procedures at the data link level for transmission errors that may be introduced by the communications channel.

In addition, SDLC makes possible the automatic recovery of most transmission errors, without the user's awareness that the error has occurred. It also allows expansion of line control functions, as additional capabilities are required in the future. Refer to the *IBM Synchronous Data Link Control General Information Manual, GA27-3093* for detailed information about SDLC.

Start-stop line control used by the IBM 2740 or 2741 Communication Terminal is available as a special feature for the 3767 terminal, permitting the user to migrate to SDLC line control at his own convenience. Simply setting a switch changes the 3767 from start-stop line control to SDLC. However, consideration must be given to the total system configuration and programming support at the time of the changeover. The 3767 Communication Terminal with the appropriate Start-Stop Line Control feature will work with existing 2740 or 2741 program support. For the user's convenience, and to simplify attaching the 3767 to a communications line, an integrated modem and an acoustic coupler are available as special features. An EIA/CCITT interface is also available for a stand-alone modem.

Other special features available for the 3767 are:

- Calculate-Scientific—the 3767, in local (offline) mode, can be used as a 16-digit desk calculator.
- Magnetic Stripe Reader—the reader may be used to transmit a terminal operator's identification and to enter data.
- Vertical Forms Control—the user can vertically format his printed output.
- Variable Width Forms Tractor—forms in a wide range of widths can be used.
- Alternate Character Set—the user can change from a primary to a secondary character set by setting a switch.

For a complete list of standard features, specify features, and special features, refer to Figures 1-1 and 1-2.

### STANDARD FEATURES

- Double Space/Single Space
- Buffer Full Alarm
- Print Inhibit
- End of Line Alarm
- Auto Switch
- Auto View

### SPECIFY FEATURES

- Keyboard Arrangements: EBCDIC, Correspondence, Katakana, and EBCDIC (World Trade)
- Line Speed of 300, 600, or 1200 bps (specify when ordering 1200 bps Integrated Modem)
- Line Speed of 200 (World Trade only), 300, 600, 1200, or 2400 bps (specify when ordering EIA/CCITT Interface)
- Data-Talk Switch (World Trade only—except Germany)
- Dial Disconnect Switch (Germany only)
- Terminal ID (must also have the 2741 Start/Stop Line Control feature)

### SPECIAL FEATURES

- 2740-1 Point-to-Point Start-Stop Line Control\*
- 2740-1 Station Control Start-Stop Line Control\*
- 2740-2 Start-Stop Line Control\* (must also have the Buffer With Edit feature, 512 or 1024 bytes)
- 2741 Start-Stop Line Control\*
- 1200 bps Integrated Modem
- 1200 bps Integrated Modem/Interrupt
- Acoustic Coupler (300 or 600 bps) (must also have the Integrated Modem feature)
- EIA/CCITT Interface
- Buffer with Edit (512 bytes) (standard on 3767 Model 2)
- Buffer with Edit (1024 bytes)
- Alternate Character Set
- Vertical Forms Control (must also have the Variable Width Forms Tractor feature)
- Magnetic Stripe Reader
- ASCII
- Calculate-Scientific
- Security Keylock

\*For details about features that are related to 2740 and 2741 start-stop line control, see Figure 1-2.

### ACCESSORIES

- Forms Stand
- Paper Roll Holder
- Variable Width Forms Tractor

Figure 1-1. Features and Accessories



Start-Stop Line Control Related 3767 Features	2740-1	2740-1	2740-2	2741
	Point-to-Point	Station Control		
PTTC/EBCD Line Code	S	S	S	S
Correspondence Line Code	S	S	-	S
1200 bps Integrated Modem	Sp	Sp	Sp	Sp
300 bps	S	S	-	S
600 bps	-	-	S	-
1200 bps	-	-	S	-
Acoustic Coupler (Note 3)	Sp	-	-	Sp
300 bps	S	-	-	S
1200 bps Integrated Modem with Interrupt (Note 4)	-	-	-	S
EIA/CCITT Interface	Sp	Sp	Sp	Sp
200 bps (WT only)	S	S	-	S
300 bps	S	S	-	S
600 bps	-	-	S	-
1200 bps	-	-	S	-
Dial Disconnect Switch (Germany only)	S		-	S
Print Inhibit	St	St	St	St
Record Checking	St	St	St	-
End of Line Alarm	St	St	St	St
Auto Switch	St	St	-	-
Buffer Receive	-	-	St	-
Buffer 120 bytes (Note 1)	-	-	S	-
248 bytes (Note 1)	-	-	S	-
440 bytes (Note 1)	-	-	S	-
Buffer Full Alarm (Note 2)	-	-	I	-
Buffer Edit (Note 2)	-	-	I	-
Auto Terminal ID	-	-	-	S

Legend:

St — Standard (no charge)

I — Included in other Feature

S — Specify Feature (no charge)

Sp — Special Feature (charge)

A dash ( - ) indicates that a related feature does not apply.

- Notes:
1. Buffer 512 or 1024 is a prerequisite for 2740-2.
  2. Included in Buffer 120, 248, and 440 byte feature for 2740-2.
  3. 1200 bps integrated modem is a prerequisite.
  4. Required only for 2-wire communications facilities.

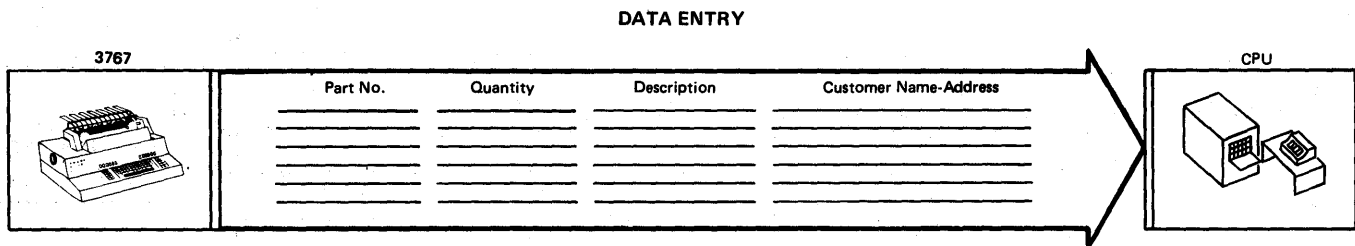
Figure 1-2. 3767 Features Related to 2740 and 2741 Start-Stop Line Control

## Applications

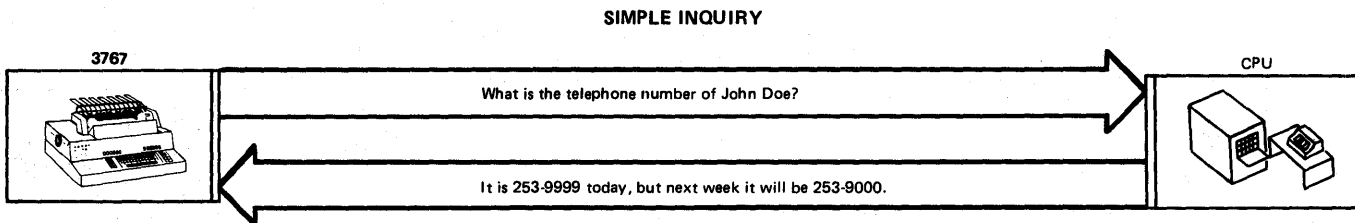
The flexibility and usefulness of the 3767 Communication Terminal are enhanced by its local mode (offline) capabilities, as follows:

- It can be used as a keyboard-printer for normal secretarial typing. Buffer editing, to ensure the correctness of entered data, is standard on the 3767 Model 2 and is available with the Buffer feature for the 3767 Model 1.
- Horizontal and vertical (using the Vertical Forms Control special feature) formatting may be done.
- The 3767 can function as a desk calculator, by adding the Calculate-Scientific special feature.

The following illustrations show some of the many applications in which the IBM 3767 can operate in communicate (online) mode.



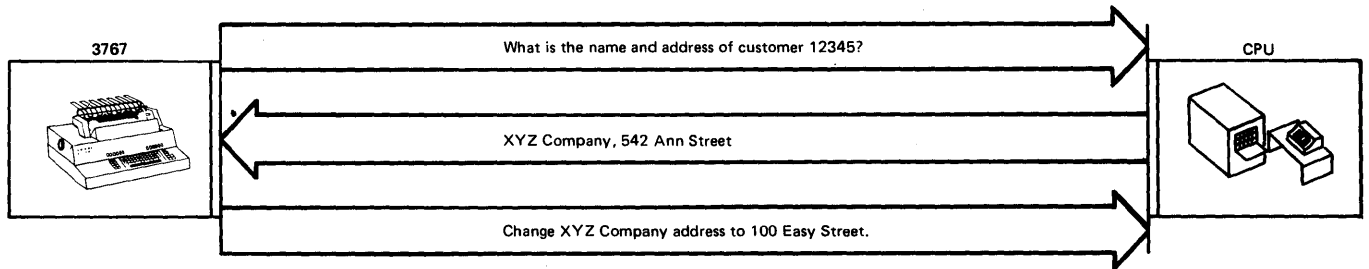
In this application, the 3767 is used primarily for entering data. Entering an order is a typical example of this type of application.



The user interrogates a data base by presenting a predefined inquiry. This type of inquiry has the following characteristics:

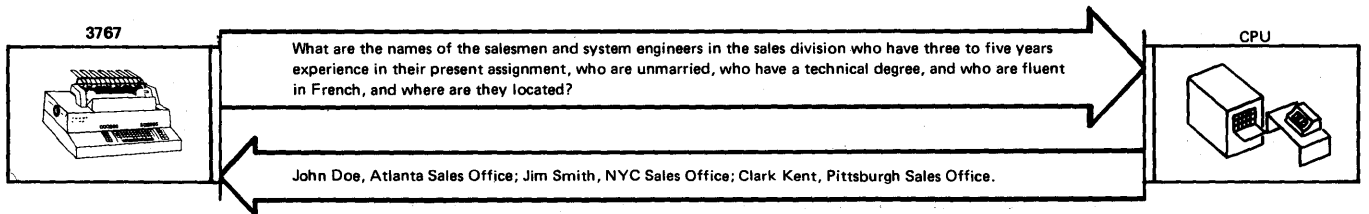
- One logical file per inquiry is searched.
- Operator has limited or no update capability.
- Output is alphanumeric.

### INQUIRY AND UPDATE



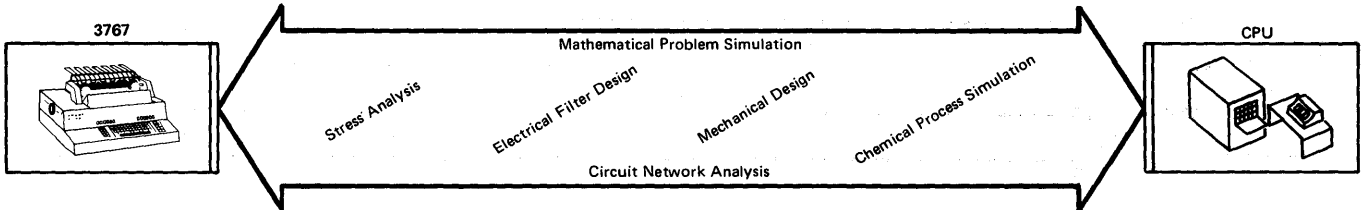
The user interrogates a data base by presenting a predefined inquiry. He then evaluates the response and, if necessary, updates the data base.

### COMPLEX INQUIRY



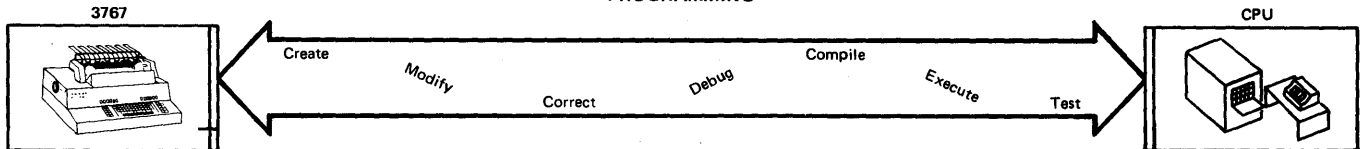
The user may interrogate a data base by presenting several unstructured, complex inquiries. More complex inquiries might involve requests for summaries, trends, and correlations among multiple files.

### PROBLEM SOLVING



This application permits the user, through time-sharing, to solve problems using high-level languages such as BASIC and FORTRAN.

### PROGRAMMING



This application permits implementing all aspects of programming.

## Printer

A fast, versatile, bidirectional matrix printer is incorporated in the 3767 terminal. Printing characteristics of the two models of the 3767 are as follows:

	<u>Model 1</u>	<u>Model 2</u>
Printing Speed (characters per second)	40 (Avg.)	80 (Max.)
Print Positions	132	132
Character Spacing (characters per inch)	10	10
Line Spacing (lines per inch)	6	6

The 3767 printer prints in the reverse or forward direction to obtain faster output. *Printing speed depends upon line speed when the 3767 is operating with 2740-1 or 2741 start-stop line control.*

## Forms

The terminal accepts forms of up to six parts with a total thickness of 0.018 inches (0.457 mm). For any multi-part or pre-printed continuous forms the Variable Width Forms Tractor (optional accessory) is recommended. Five and six part continuous forms should be tried on an individual basis for acceptable feeding, registration, and print quality. Single part continuous or up to four part cut forms can be used with the standard friction feed platen. Maximum overall forms width is 15 inches (381 mm); card stock forms are not recommended. Refer to *Form Design Reference Guide for Printers, GA24-3488*, for form specifications and limitations. Forms, whether cut or continuous, must not contain metallic staples, and multipart cut forms must be glued together at the top edge.

## Keyboard Character Sets and Transmission Codes

The user may select one of three available keyboard character sets, as follows:

Character Set	No. of Chars.	Data Keys
EBCDIC (US/WT)	88/96*	44/48*
Correspondence (US only)	88	44
Katakana (Japan only)	128	48
ASCII	96	48

\*Non-USA keyboards have 47 data keys (UK has 48). 88 and 44 apply to USA keyboards; 96 and 48 apply to Non-USA keyboards.

See Appendix A for illustrations of keyboard variations.

EBCDIC transmission code is used for data under SDLC. With the ASCII feature, either EBCDIC or ASCII transmission codes may be selected by the CPU. For start-stop line control either the PTTC/EBCD or Correspondence transmission code may be used. See Figure 3-1.

## Local Mode Operations (Offline)

The following operations can be performed when the terminal is in local mode:

Keyboard-to-printer	(standard feature)
Keyboard-to-printer with editing	(included in Buffer feature)
Tab setting*	(standard feature)
Vertical Forms Control (VFC) setting*	(special feature)
Offline calculation	(special feature)
Test*	(standard feature)

\*This status can be entered when the terminal is in either local or communicate mode.

When the terminal is in local mode, it may be used for normal secretarial typing. To perform other local mode operations, the user needs only to set the Test, Edit, or calculate switch or to press a function key.

## Communications Facilities

The customer may choose from the wide variety of communications facilities described in the following text (refer to Figures 1-3 and 1-4).

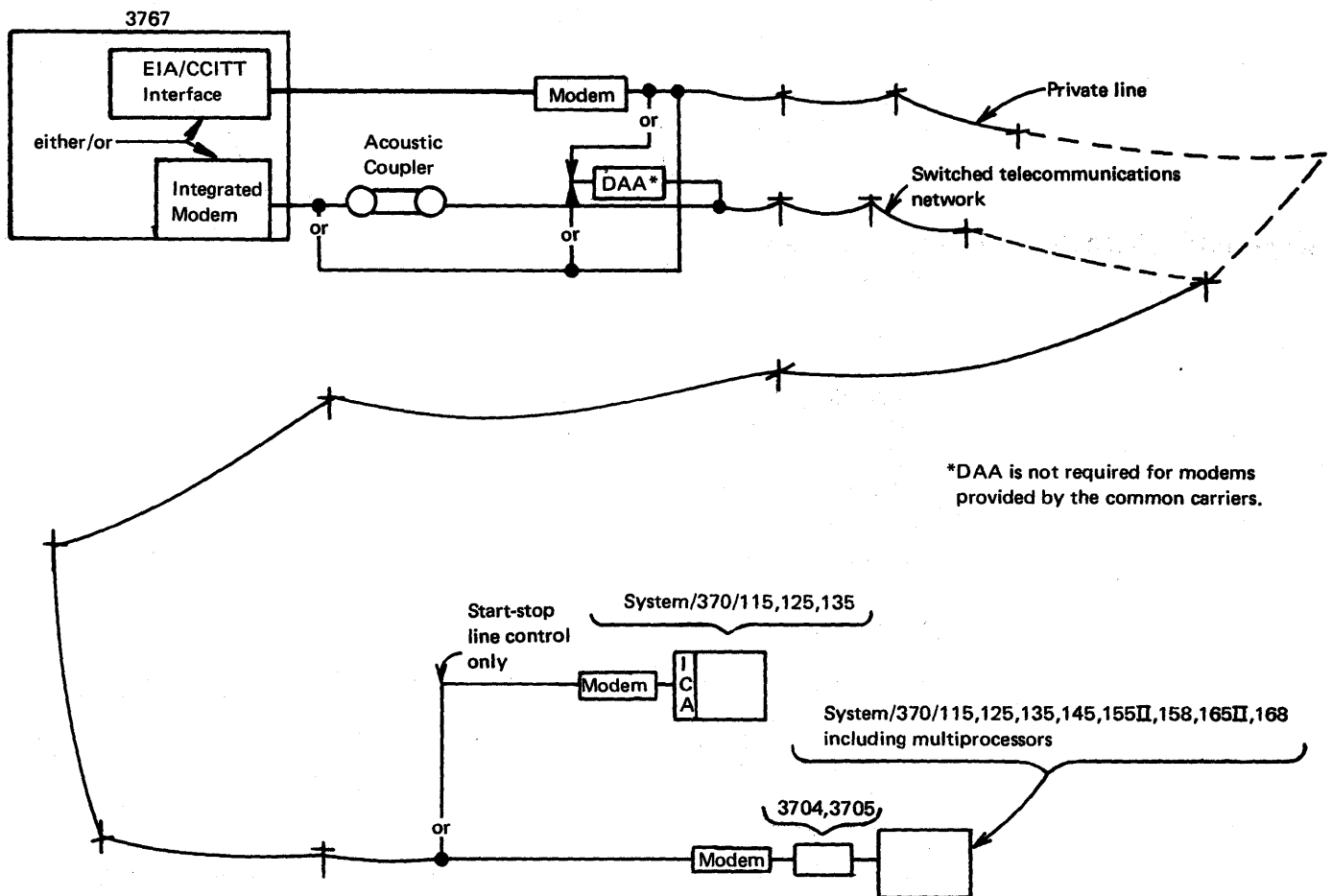


Figure 1-3. Communications Facilities

Line Attachment \ Line Control	SDLC	2740-1/ 2741	2740-2
1200 bps Integrated Modem	600/1200 bps	300 bps	600/1200 bps
1200 bps Integrated Modem plus Acoustic Coupler	600 bps	300 bps	—————
EIA/CCITT Interface	600/1200/ 2400 bps	200*/300 bps	600/1200 bps

\*Non-USA only.

Figure 1-4. Line Speeds

### ***SDLC (Basic or Buffered) or Start-Stop, Point-to-Point***

In this configuration the 3767 operates in half-duplex mode over the following facilities:

1. Common-carrier leased private-line service, non-switched (or the equivalent privately owned service), using an integrated modem or an EIA/CCITT interface with an IBM stand-alone modem (or an equivalent stand-alone modem, or service, of another manufacturer)
2. Common-carrier switched telecommunications network, using an integrated modem and a DAA\*, an integrated modem with an acoustic coupler, or an EIA/CCITT interface with an IBM stand-alone modem and a DAA\* (or an equivalent stand-alone modem, or service, of another manufacturer).

### ***SDLC (Basic or Buffered) or Start-Stop Multipoint***

In this configuration, the 3767 operates in half-duplex mode over the following facilities:

Common-carrier leased private-line service, non-switched, (or the equivalent privately owned service), using an integrated modem or an EIA/CCITT interface with an IBM stand-alone modem (or an equivalent stand-alone modem of another manufacturer).

### ***Modems***

The customer may consider the following modem configurations for his installation:

- Switched Network—Integrated modem with DAA or acoustic coupler, or an EIA/CCITT interface for stand-alone modems
- Leased Line—Integrated modem or EIA/CCITT interface for stand alone modems

Refer to "Chapter 3. Special Features" for more information.

### ***Maintenance Aids***

The 3767 is designed to allow fast analysis and repair of malfunctions by service personnel. It is packaged so that failing units can be readily adjusted or replaced. Indicators, print-outs, automatic test procedures, online tests, and maintenance analysis procedures are provided to facilitate isolation of the problem or failing unit.

\*DAA (Data Access Arrangement) is a protective interface device provided by the common carrier when non-carrier-provided modems are used on the switched telecommunications network.

## ***Operator Test (Test Switch)***

The operator can run the automatic test procedure by momentarily pressing the Test switch. This procedure tests the hardware of the terminal. It (with Problem Determination Procedures described in *IBM 3767 Communication Terminal Operator's Guide*) informs the operator, by means of indicators, alarms, and printouts, of the current status of the terminal.

## Chapter 2. Operating Characteristics

### Modes of Operation

The 3767 has two modes of operation:

- Communicate (online)
- Local (offline)

In communicate mode, the 3767 communicates with a 3704 or 3705 Communications Controller (or the Integrated Communications Adapter (ICA) in start-stop line control mode) of certain host systems, using one of the following line control methods:

Standard: SDLC

- Optional
- 2741 start-stop
  - 2740-1 point-to-point, start-stop
  - 2740-1 station control, start-stop
  - 2740-2 start-stop

### Communicate Mode

The 3767, while it is in communicate mode, has the following operating characteristics.

#### Standby

The 3767 enters this state from a power-on reset, or when not in either transmit or receive state. The 3767 has the following characteristics in the standby state:

- The keyboard is normally unlocked, and the Proceed light is on.
- The 3767 will accept data entered from the keyboard or the communication line, whichever occurs first.
- The Cancel key is not active.
- The Attention and System Request keys are active.

#### Transmit

The 3767 enters this state, from the standby state, when the operator enters the first data byte into the buffer. Also, the 3767 enters this state from the receive state when the last (or only) message segment has been printed and the CPU has asked for a change in data flow direction. The 3767 has the following characteristics in the transmit state.

- The keyboard is normally unlocked and the Proceed light is on. The keyboard locks if all buffer segments contain data that is ready to be transmitted or data that is in the process of being transmitted.
- The Cancel and Attention keys are active.

#### Receive

The 3767 enters this state, from the standby state, when the first data byte of a message is received from the CPU. The 3767 enters this state from transmit state when the last (or only) message segment has been transmitted and the 3767 requests a change in data flow direction from the CPU.

The 3767 has the following characteristics in the receive state:

- The keyboard is locked (except for the Attention and Cancel keys).
- The Proceed light is off.

#### Transmit Interrupt

While the terminal is in a transmit state, the CPU can interrupt the transmission and send a message to the 3767. When this occurs, the entered data is automatically purged, the Proceed light goes off, and the terminal reverts to receive status.



The CPU can also signal the terminal operator by transmitting a bid request. This turns on the CPU Select light. The operator then has two choices, as follows:

1. He can continue entering the message, then press the EOM key to transmit the rest of the message, or
2. He can press the Cancel key, which clears the buffer and causes any part of the message that may have been transmitted previously, to be discarded by the CPU.

### Receive Interrupt

If the terminal operator wishes to transmit a message and the terminal is in the receive state, he presses the Cancel key. This interrupts the CPU. The 3767 ignores the rest of the message segment being transmitted by the CPU. The operator can also signal the CPU by pressing the ATTN key.

### Basic SDLC Transmit

The operator may enter up to 256 bytes before he starts transmission. If the operator has entered less than 129 bytes, additional bytes can be entered while transmission is in progress (after pressing the EOB or EOM key if specified by the CPU).

If the Auto switch is on, pressing the Return key or the FORM FEED key also starts the transmission.

If the operator fills the second segment before the first segment's data has been transmitted, the Proceed light goes off (and the keyboard locks) until all of the data in the first segment has been transmitted error-free. If the data entered occupies more than one segment, it is transmitted as one message segment, and no overlapped transmission and keyboard entry is possible.

A buffer overflow condition occurs if the operator tries to enter more than 256 bytes before starting transmission. The Proceed light goes off, and a long audible tone sounds. This condition is reset by pressing the Reset, Buffer Return, Buffer Backspace, EOB, or EOM key. A short (250 ms) audible tone sounds when the print position is 10 positions from the right margin and when the buffer is equal to, or less than, 10 bytes from being full.

### Buffered SDLC Transmit

The 512-byte buffer in the 3767-2 (or the 3767-1 with the 512-byte Buffer Expansion feature) is divided into two 256-byte segments. The 1024-byte buffer (Buffer Expansion feature) is divided into four 256-byte segments. The operator may enter up to 512 or 1024 bytes before he starts transmission, if the Edit switch is on. Data can be entered while transmission is in progress, if one of the other buffer segments is empty when the EOB or EOM key is pressed (or the RETURN or FORM FEED key, if the Auto switch is on). If the Edit switch is off, the entered data is automatically transmitted when a buffer segment is filled.

If all of the buffer segments contain data, the Proceed light goes off (and the keyboard locks) until the data from at least one of the segments has been transmitted error-free. A buffer overflow condition occurs if the operator tries to enter more than 512 or 1024 data bytes before starting transmission. This condition must be reset, as has just been described under "Basic SDLC Transmit"; the Buffer Line Return key also performs this reset with buffered SDLC.

## **Basic or Buffered SDLC Receive**

The 3767 can receive a message containing up to 256 data bytes per transmission. The received data is stored, starting at byte 1 of segment 1.

Message printing starts after a message segment has been received without an error. A response is transmitted immediately (with buffered SDLC) if at least one buffer segment is free or when the entire buffer is free (with basic SDLC).

A buffer segment is considered to be free if it is empty or if it has transferred its information to the printer.

## **Buffer Edit**

Total text (buffer) edit, with the 3767 in communicate or local mode (with the Edit switch on), is standard on the 3767 Model 2 and is included in the Buffer with Edit special feature available for the 3767 Model 1. Single line editing, with the 3767 in communicate mode and the Auto switch on, is standard on both models. Data that the operator wishes to edit before transmission must be entered while the 3767 is in communicate mode.

## **Current and Edit Pointers**

These pointers are introduced here to explain the buffer editing operation. The current pointer points to the next available buffer position. The edit pointer keeps in step with the current pointer during data entry. However, the edit pointer may be decremented by the Buffer Return, the Buffer Line Return, or the Buffer Backspace key. It may then be incremented by data keys or by the Print Buffer, the Print Line, or the Print Character key until it reaches the current pointer. The data that is transmitted lies between the beginning of the buffer and the edit pointer.

The Buffer Return and Buffer Backspace keys are operative during single-line editing. All of the buffer edit keys are operative during total text edit.

## **Local Mode**

The 3767 can be used as a keyboard-printer for secretarial typing. In addition, the following operations are possible:

- Total text edit—This feature is standard on the 3767-2 and is included in the Buffer with Edit special feature for the 3767-1. It is operative when the 3767 is in local mode, with the Edit switch on, and allows an operator to verify, cancel, and reenter data before it is printed. A total text edit may also be made when the 3767 is in communicate mode.
- Vertical format setting—Refer to “Vertical Forms Control” in “Chapter 3. Special Features”.
- Offline Calculation—Refer to “Calculate-Scientific” in “Chapter 3. Special Features”.

## **Horizontal Formatting**

Tabbing is the movement of the carrier to the right, when the Tab key is pressed or when the appropriate control characters are received from the CPU. The tab and left or right margins may be set at any point between print position 1 and 132.

The Tab key is operative when the terminal is in either communicate or local mode. The terminal must be in communicate mode for a tab operation to take place under CPU control.

When a tab operation is initiated, the carrier moves to the right until it encounters a tab stop. The tab and left or right margins may be set by the operator when the terminal is in local or communicate mode, or by the CPU when the terminal is in communicate mode under SDLC line control.

## **Terminal Identification and Addressing**

### ***Terminal ID***

Each terminal operating under SDLC has a permanent, unique, four-byte identification that it will transmit in response to a request for its ID. This identification is fixed at the time of manufacture and is not selectable.

Terminal ID is also available with the 2741 Start-Stop Line Control feature. Upon receipt of a "Prefix +" code sequence, the terminal will automatically transmit a four character sequence following the normally transmitted circle D.

### ***SNA Terminal Address***

The SNA terminal address is a one-byte address that may be selected by the customer; however, it must be specified at time of machine order. Any two hexadecimal characters may be selected for the byte address, with the exceptions of '00' and 'FF'.

## Chapter 3. Special Features

### Start–Stop Features

#### **2740-1 Point-to-Point Line Control**

This feature enables the user to communicate with the CPU by the 2740-1 point-to-point, start-stop line control. (See *IBM 2740 Communication Terminal Models 1 and 2 Component Description*, GA24-3403, for detailed 2740 line control information.)

The following 2740-1 functions are supported by the 3767 having this feature:

- Record checking
- Auto EOB

The Transmit Control special feature is not available on the 3767.

#### **2740-1 Station Control Line Control**

This feature enables the user to communicate with the CPU by 2740-1 station control start-stop line control. (See *IBM 2740 Communication Terminal Models 1 and 2 Component Description*, GA24-3403, for detailed 2740 line control information.)

The following 2740-1 functions are supported by the 3767 having this feature:

- Record checking
- Auto EOB

Refer to Appendix B for the terminal and group address.

#### **2740-2 Line Control**

This feature enables the user to communicate with the CPU, under 2740-2 start-stop line control. See *IBM 2740 Communication Terminal Models 1 and 2 Component Description*, GA24-3403, for detailed 2740 line control information.

The following 2740-2 functions are supported by the 3767 having this feature:

- 2740-2 line control with Record Checking and Buffer Receive
- Buffer edit

The Header Control special feature is not available on the 3767. Refer to Appendix B for the terminal and group address.

#### **2741 Line Control**

This feature enables the user to communicate with the CPU by 2741 start-stop line control. (See *IBM 2741 Communication Terminal Component Description*, GA24-3415, for detailed 2741 line control information.)

The following 2741 line control features are standard on the 3767:

- Receive Interrupt
- Transmit Interrupt
- Print Inhibit
- Terminal ID (Appendix B)

Unlike the 2741 operation, a vertical redundancy check is made on each received character.

## 1200 bps Integrated Modem

This IBM integrated modem enables a terminal to be attached to a public switched telecommunication network by a DAA or acoustic coupler, or to a private line.

The integrated modem permits half-duplex operation at line speeds of up to 1200 bps.

## 1200 bps Integrated Modem With Interrupt

This feature is available for the 3767-1 and -2. It is required only with 2741 start-stop line control and the 1200 bps Integrated Modem, when it is used on a two-wire facility. It enables the user to interrupt incoming data by pressing the Attention key. It also enables the CPU to interrupt data being received from the 3767.

## Modem Interfaces

The following text briefly describes the modem interfaces available for the 3767.

### *Data Access Arrangement (DAA)*

This interface provides the connection between the integrated modem and a switched telephone network. A common-carrier-type, CDT, manual DAA (or equivalent) is used.

A data call using the CDT DAA is placed in the same way as placing a call with a telephone. Calls are made from the 3767, with the manual CDT DAA, to a CPU having either a manual CDT DAA or an auto answer feature and a CBS-type coupler.

### *Acoustic Coupler*

This interface connects the 3767 to a switched telephone network, using an ordinary telephone, and is useful in applications requiring relocation of the terminal. The integrated modem must be used with the acoustic coupler.

The handsets of the following telephones, or equivalent, can be used with the acoustic coupler (novelty handsets are excluded):

Automatic Electric:

Type 811 handset, used with the type 800 telephone set

Kellog-ITT, Stromberg Carlson, Western Electric:

Type G handset, normally supplied with the type 500 telephone set

### *EIA/CCITT Interface*

This interface provides the signals and signal conversions required for use with an EIA-type stand-alone modem. Some of the IBM stand-alone modems available for use with the 3767 are:

IBM 3976 Model 1	}	World Trade only
IBM 3976 Model 2		
IBM 3976 Model 3		
IBM 3872 (1200/2400 bps, using SDLC)		

### **Buffer With Edit (512 bytes)**

This feature (standard on the 3767) provides the 3767-1 with buffered SDLC capability. It also includes buffer editing, which allows the correcting and manipulating of buffer data before transmission.

### **Buffer With Edit (1024 bytes)**

This feature, available as a special feature for the 3767-1 and -2, expands (to 1024 bytes) the buffer space available for buffered SDLC operation.

## Alternate Character Set

This feature gives the customer a second character set. For example, the user whose main application is EBCDIC can also use APL. The selection is made by simply setting EBCDIC/APL switch to the APL position. Nomenclature is provided on a decal card. These decals may be removed from the card and attached to the front of the appropriate keys, or the operator may carry the card for easy reference. Additional cards may be ordered. Refer to Figure 3-1 for available primary and alternate character sets. Only one alternate character set per terminal may be specified.

Primary Char. Set (Keyboard)	Alternate Char. Set	SDLC				Start-Stop					
		Graphics		Line Code	Graphics		Line Code	P T T C / E B C D			
		C o r r e s p o n d e n c e	E B C D I C	M O N O	E B C D I C	C o r r e s p o n d e n c e	E B C D (note 1)		A P L	M O N O (note 1)	C o r r e s p o n d e n c e
Correspondence	EBCDIC APL	X	X		X X	X	X		X	X	
EBCDIC	Correspondence APL MONO (note 2)	X	X		X X	X	X	X	X		X X X

Notes:

1. Subset of EBCDIC
2. Uppercase alphabetic characters are printed from the Keyboard; upper or lowercase characters may be printed from the communications line.

Figure 3-1. Primary and Alternate Character Sets

## Vertical Forms Control (VFC)

This feature operates with SDLC line control only and enables the operator (in local or communicate mode) or the CPU (in communicate mode) to arrange the printed output in a desired vertical format.

With this feature, one page can contain up to 102 vertical tab positions. The operator and/or the CPU can perform vertical tab and form feed functions.

## Variable Width Forms Tractor

With this accessory installed (Figure 3-2), the customer can use pinfeed paper with hole-to-hole dimensions of from 3 to 14 1/2 in. (76.2 to 368.3 mm) and 15 in. (381 mm) overall. This feature must be installed with the Vertical Forms Control (VFC) feature, to ensure continuous-form registration.

## Magnetic Stripe Reader

This magnetic stripe reader (Figure 3-2) reads information magnetically encoded on a stripe along the edge of a card, such as a credit card. It operates with SDLC line control only.

The following applications are representative of those that a customer may wish to implement:

- Operator identification
- Client account or transaction code
- Parameter information
- Reader information
- Master record

The magnetic stripe reader is cable-connected to the 3767. The reading mechanism and control logic receive their power from the 3767. Power is on in the reader whenever 3767 power is on and the cable is connected.

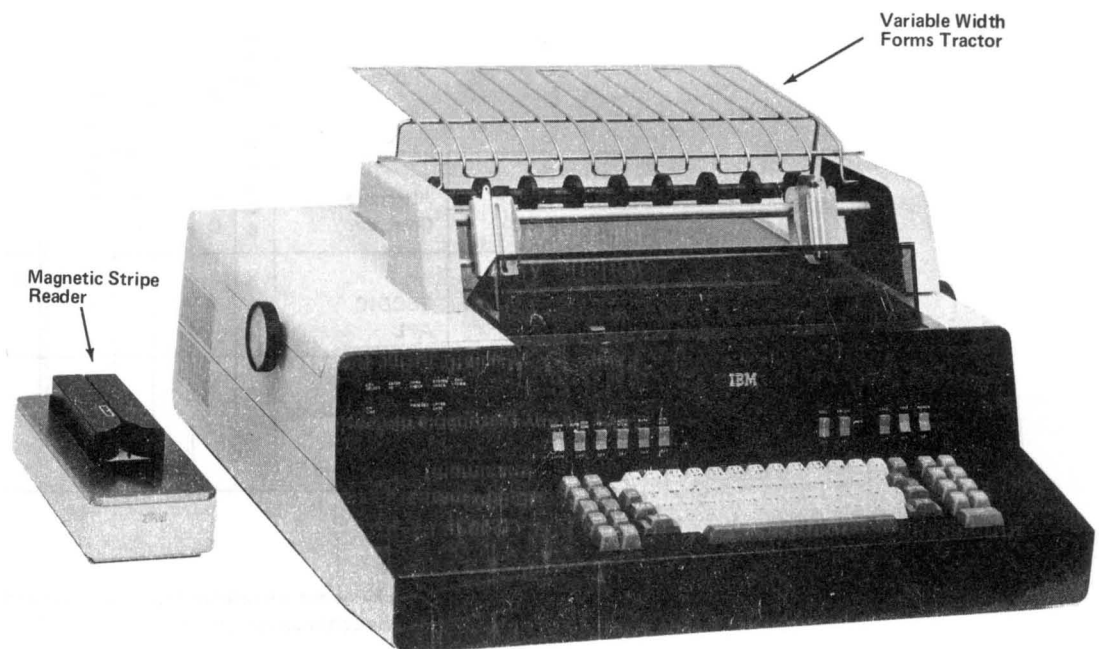


Figure 3-2. Magnetic Stripe Reader

### *Using the Magnetic Stripe Reader*

The reader is ready to read a magnetic stripe on a card when the 3767 Proceed light is on. Two types of data may be read.

1. An operator ID (Print Inhibit) to be transmitted to the host in the following ways:
  - a. If operator ID is encoded in the second position on the magnetic stripe then the terminal will inhibit printing of card data.
  - b. The CPU may request the terminal operator's ID and send a Print Inhibit code that inhibits the 3767 from printing the operator's ID. The Print Inhibit code also turns on the Print Inhibit light. Print Inhibit status is reset when the 3767 receives the Enable Print code from the CPU.
2. The Magnetic Stripe Reader may also be used as an extension of the keyboard for data entry (non-Print Inhibit).

### ***Transmission Characteristics***

The information read from the magnetic stripe card is tested for correct parity, LRC, Start of Message character, document insertion, and reading speed.

### ***Magnetic Code***

Data must be recorded, using the ABA 5-bit code, which is the 4-bit BCD subset with odd parity. The bit density for an ABA track is 75 bits per inch (25.4 mm), and data must be recorded, using two-frequency coherent phase recording (F2F).

For details of coding techniques and guidelines, the user should refer to the ABA magnetic stripe credit card specifications.

### ***Magnetic Stripe Card Specifications***

The card may be made of card stock or plastic.

The laminated stripe may be of any practical length, but the magnetic track dimensions and the distance from the bottom edge of the card must be as specified in Figure 3-3.

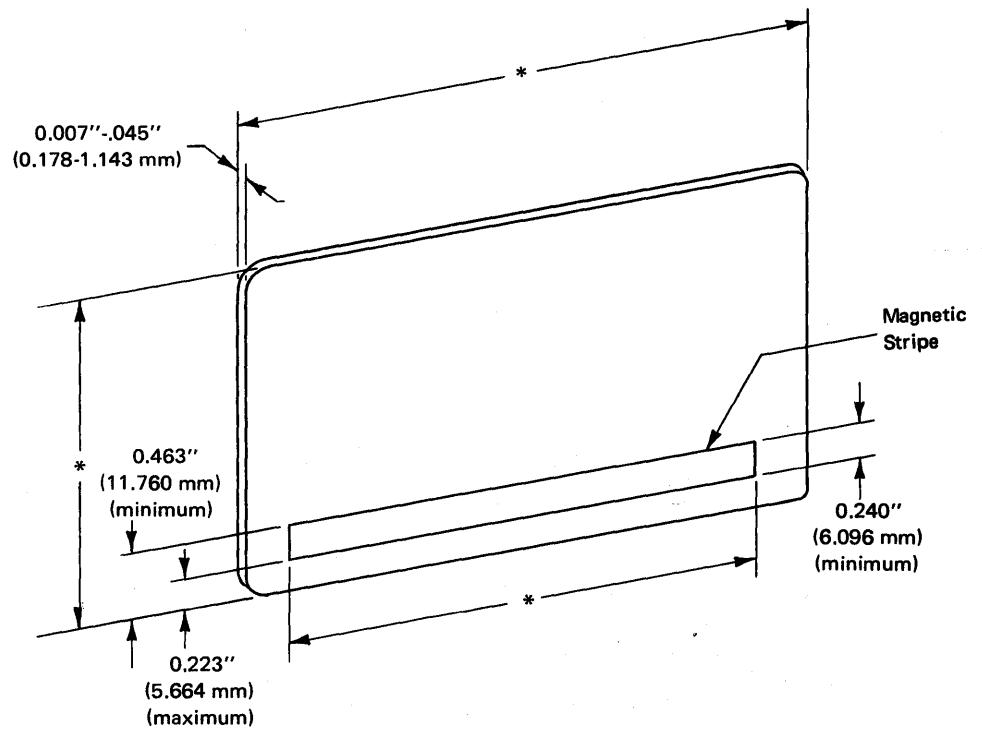


Figure 3-3. Magnetic Stripe Reader Card Specifications

### **ASCII**

With the ASCII feature, the user can transmit ASCII data over a communication line using an ASCII keyboard.



## Calculate-Scientific

With this feature installed, the terminal can be used as a desk calculator in local mode when the Calc switch is on. Certain keyboard keys change their function when the terminal is in offline calculate status (see Figure 3-4). Nomenclature is provided on a decal card. These decals may be removed from the card and attached to the front of the appropriate keys, or the operator may carry the card for easy reference. Additional cards may be ordered.

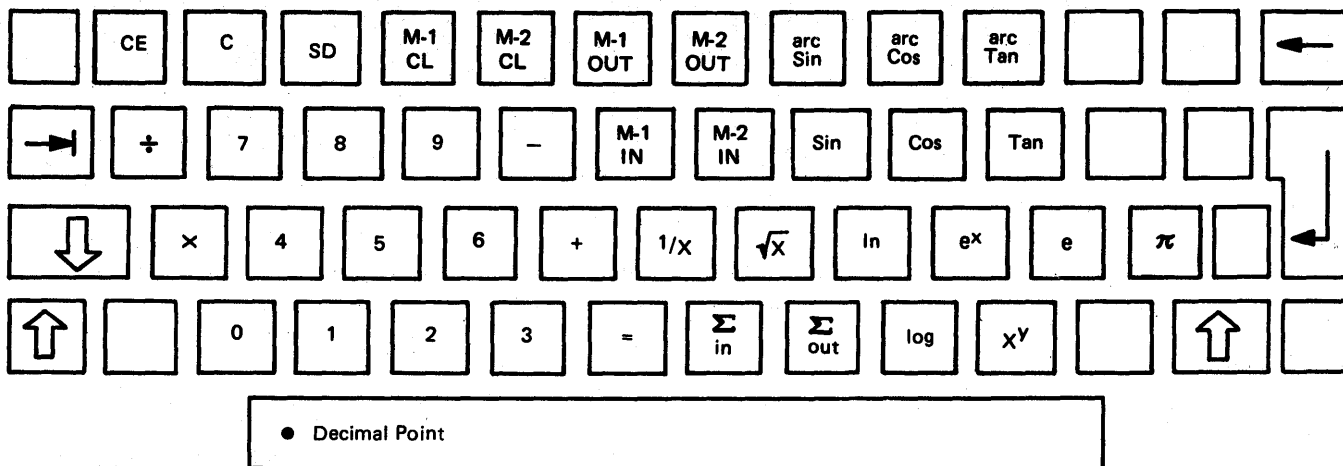


Figure 3-4. Key Arrangement for Calculate-Scientific Feature

Since the terminal is in local mode when it is being used as a desk calculator, calculation results cannot be automatically transmitted, nor can received data be automatically used as input for calculation.

### Calculate Functions

The Calculate-Scientific special feature provides the following functions, with 16-digit precision:

addition	Log X	In X	Sin X
subtraction	Cos X	Tan X	Sin <sup>-1</sup> X
multiplication	Cos <sup>-1</sup> X	Tan <sup>-1</sup> X	x <sup>y</sup>
division	e <sup>x</sup>	e	π
inversion			
square root			
mean/standard deviation			

### Entering Calculate Status

The terminal must be in local mode for the Calculate switch to be effective. Place the terminal in local mode by setting the Local/Comm switch to the Local position. Then set the Calculate switch to the Calc position. See the *IBM 3767 Communication Terminal Operator's Guide*.

### Offline Calculation Characteristics

The following text describes the characteristics of the terminal when it is used as a calculator.

## Maximum and Minimum Values

The maximum absolute value the terminal can handle is a 16-digit number made up of all-9s:

9999999999999999.

The minimum absolute value is this 16-digit fraction:

.0000000000000001

## Decimal Point Position

The user can set the decimal point at any of the 17 possible positions. Once set, this position should not be changed during the course of a particular problem.

If the user does not set the decimal point position at the start of offline calculations, the terminal assumes a “default” position for the decimal point. This “default” position provides for a 12-digit integer and a 4-digit fraction.

## Sign

Both positive and negative numbers can be used in calculation. The range and precision of entries and answers are independent of the sign.

## Error Conditions

If the operator makes an erroneous entry, the following error conditions can occur:

**Multiple Pressing of the Decimal Key:** When the user enters a number, the first decimal point entry determines the separation of integers and fractions. Any other decimal point entries for the same number are ignored.

**Overflow:** If a number is entered that has more positions in its integer portion than are allowed by the current decimal point position, the operation is stopped, the overflow is printed, and all registers except memory are cleared.

The operator must then press the Accumulator Clear key to resume calculations.

**Underflow:** If a number is entered that has more positions in its fraction part than are allowed by the current decimal point position, the excess digits are ignored. The operation may be completed, however, using the truncated fraction.

## Paper Roll Holder

This feature gives the user a paper roll holder to facilitate the use of single-part paper rolls with the following specifications:

Maximum paper width:	15 inches (381 mm)
Maximum roll diameter:	5.5 inches (139.7 mm)
Minimum spool inside diameter:	0.40 inches (10.2 mm)
Paper weight:	16--20 pounds (7.3--9.1 kg)
Basis:	500 sheets, 17 x 22 inches (431.8 x 558.8 mm)

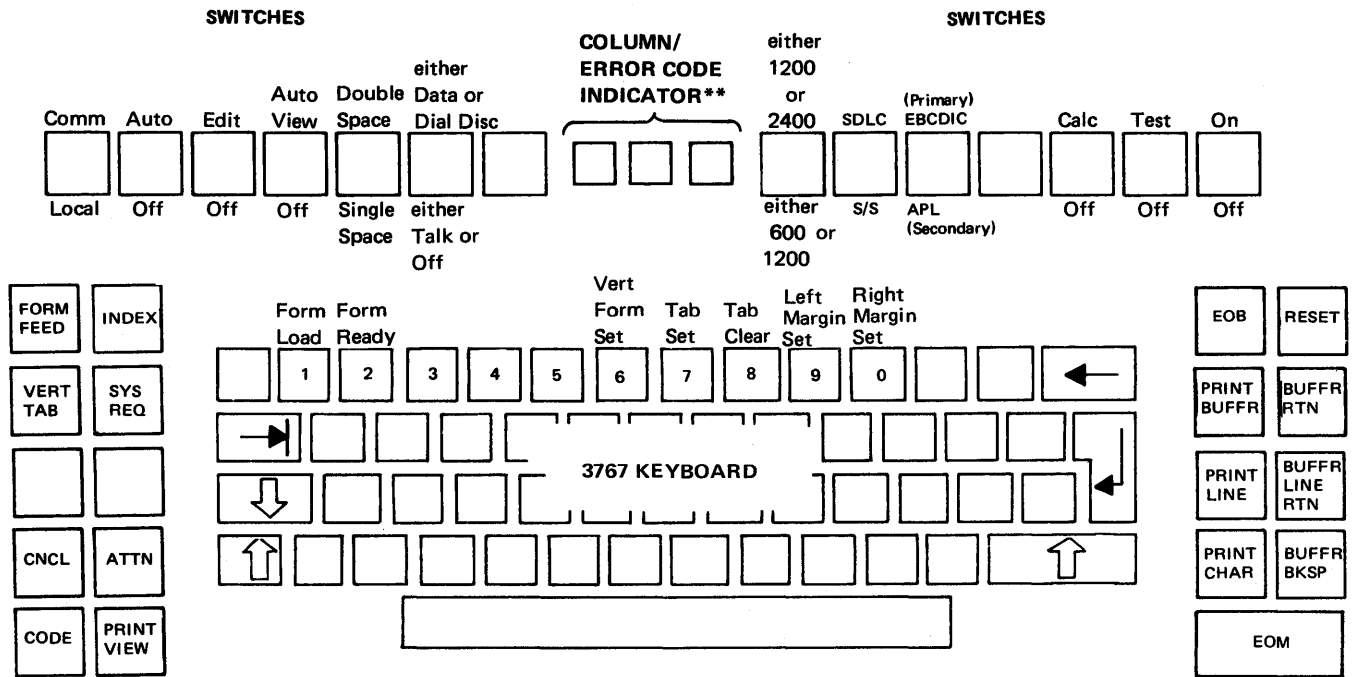
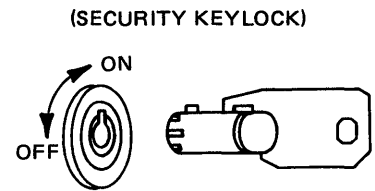
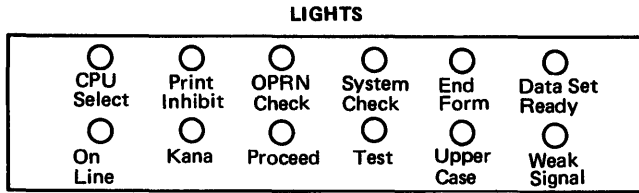
## Security Keylock

This feature enables the user to prevent unauthorized use of the terminal. Each terminal has a unique key.

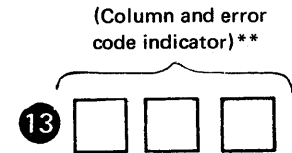
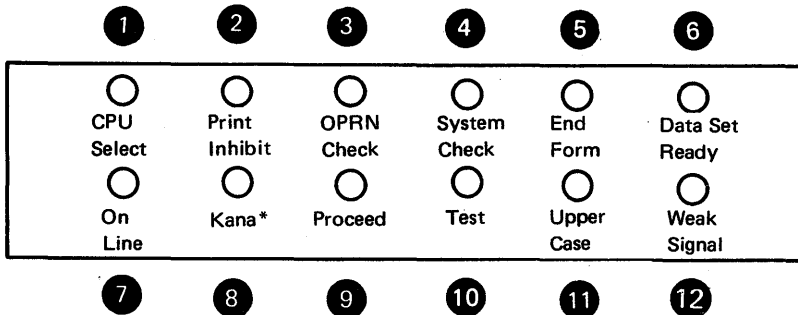


# Chapter 4. Operating Controls

## 3767 Lights, Switches Keyboard and Security Keylock



### Lights (Illustration)



\*Japan only  
\*\* ANR (Alpha-Numeric Readout)

## 1 CPU Select

This light indicates the following conditions under the specified line control:

- SDLC—The CPU wishes to send a message to the terminal, and the terminal is not in receive state. The light goes off when the terminal starts to receive the message.
- 2740-1 with Station Control—The terminal was addressed by the CPU while the terminal was out of forms, or while in local mode, or in the bid state of communicate mode. The light goes off when any one of the following occurs:
  - Bid state is terminated by a CPU poll.
  - The terminal is switched from local to communicate mode.
  - Forms are inserted in the machine.
- 2740-2 Start-Stop\*—The terminal was addressed by the CPU while the terminal was out of forms, was in the enter, bid, or buffer print state of communicate mode or while it was in local mode. The light goes off when a positive answer is returned for addressing. This is accomplished when any one of the following occurs:
  - Forms are inserted in the machine.
  - Bid state is terminated by a CPU poll.
  - Buffer print state ends.
  - The terminal is switched from local to communicate mode.
  - Enter state is ended when the RESET key is pressed.

\*This light serves the same purpose as the 2740-2 Attention light.

## 2 PRINT Inhibit

This light indicates that data entered from the keyboard or the magnetic stripe reader will not be printed. The light is turned on by a CPU message. Such a message includes the print inhibit code, to prevent printing. The light goes off when a message from the CPU enables printing. This light is also turned on during the reading of a magnetic stripe card encoded with an operator ID character.

## 3 Operation Check

This light indicates that an operational error has occurred. Operator intervention is required to correct the situation. The following conditions cause this light to come on:

1. An error is detected while a magnetic stripe card is being read; the Proceed light remains on. Press the Reset key to turn the Operation Check light off, and reread the card.
2. An invalid character or value is detected during a vertical format setting operation; the Proceed light remains on. Press the RESET key and reenter the corrected parameters.
3. The following keyboard operation errors cause the Operation Check light to come on:
  - a. If the Backspace key is pressed when the column indicator shows "1".
  - b. If any data key or the Space or the Tab key is pressed when the column indicator shows "133".
  - c. If the Horizontal Tab key or the Vertical Tab key is pressed after the final tab stop setting has been passed.
  - d. If the Index or the Return key is pressed when the form is at the bottom margin (if the VFC special feature is installed).
  - e. If the Buffer Line Return or the Buffer Backspace key is pressed when the edit pointer is at the beginning of the buffer.
  - f. If the Buffer Backspace key is pressed when the preceding character is the "New Line" (NL) or "Form Feed" (FF) character.
  - g. If invalid function key combinations (Code key plus data keys) are pressed.

- h. If an attempt is made to edit or to print secure data in the buffer; secure data is data that is print-inhibited.
- i. If any inactive key is pressed when the SDLC/Start-Stop switch is in the S/S position.

## 4 System Check

This light is turned on by three classes of error conditions:

1. Network errors
2. Line errors
3. Machine checks including printer and keyboard hardware errors.

An ANR error code display also occurs with each of these classes of errors. These error conditions are described in the following text.

### Network Errors

The System Check light comes on when the terminal receives network error status sense information from the CPU, in response to the terminal's transmission. The RESET key may be pressed to turn off the light. The CPU may transmit a message stating the restart procedure.

### Line Errors

The following line errors, under the specified line control, turn on the System Check light:

**Line Break (SDLC line control):** The 3767 does not receive any SDLC frames in more than 20 seconds. The System Check light can be turned off by pressing the RESET key or by receiving any information from the CPU.

**VRC, no-stop bit, or buffer overflow (2741 line control):** Any of these errors turn on the System Check light. An error graphic is also printed, in place of the character in error, for VRC and no-stop bit errors. The audible alarm sounds for approximately 60 seconds when a buffer overflow occurs. The System Check light and the audible alarm can be turned off by pressing the RESET key.

**VRC/LRC, no-stop bit, a (N) received after transmission, or buffer overflow (2740-1 and -2 line control):** Any of these errors turn on the System Check light. An error graphic is also printed if a (N) is received (2740-1 only). The audible alarm sounds for approximately 60 seconds when a buffer overflow occurs. The System Check light and the audible alarm can be turned off by pressing the RESET key.

**(N) received for five successive transmissions of the same message (2740-2 line control):** This error turns on the System Check light. The light can be turned off by pressing the RESET key.

### Machine Check

Hardware logic errors turn on the System Check light. To turn the light off under some conditions, a power-on reset is necessary. This is done by turning the Power On/Off switch off momentarily, then turning it on again. Under other conditions, only pressing the RESET key is necessary.

## 5 *End of Form*

This light operates in conjunction with the End-of-Forms detector. When it is on, it indicates that the terminal has run out of forms. To turn off the light, the operator should:

Load the required forms (the light will go off) and then press the CODE key and the Form Ready keys simultaneously.

Note: The End of Form light will not come on when friction-feeding is used.

## 6 *Data Set Ready*

This light indicates that the data communications equipment is operational.

## 7 *On Line*

This light indicates that the terminal is in session (SDLC line control). It also indicates that the terminal is either receiving or transmitting data. It goes off when:

1. The terminal is receiving or transmitting a message segment.
2. The Communicate/Local switch is set to the Local position.
3. A session is terminated (SDLC).

## 8 *KANA*

This light is available with the Katakana keyboard and is on when the keyboard is in either the Katakana or Kana symbol shift.

## 9 *Proceed*

This light indicates that the operator can enter data from the keyboard or from the magnetic stripe reader. The terminal may be in either communicate or local mode. The light will be on, under SDLC line control, when:

1. The Communicate/Local switch is set to the Local position.
2. The terminal is not in the receive state of communicate mode and the buffer is available for data entry.
3. The SYS REQ key is pressed.

This light is on, under 2740-1 or -2 or 2741 line control, whenever the operator can enter data from the keyboard.

The light is off, under SDLC line control, when:

1. The Communicate/Local switch is set to Comm from Local.
2. The terminal changes to the receive state, from either the standby or transmit state.
3. A buffer full condition occurs during data entry.
4. The keyboard is locked.
5. An end-of-forms condition occurs.

## 10 *Test*

This light indicates that the automatic test procedure is operating. An error-free test is indicated when the Test light goes off. A test error is indicated when the Test light is on and a combination of other lights remains on. The combination of lights that remain on depends upon the test error.

## 11 *Upper Case*

This light indicates that the keyboard is in uppercase.

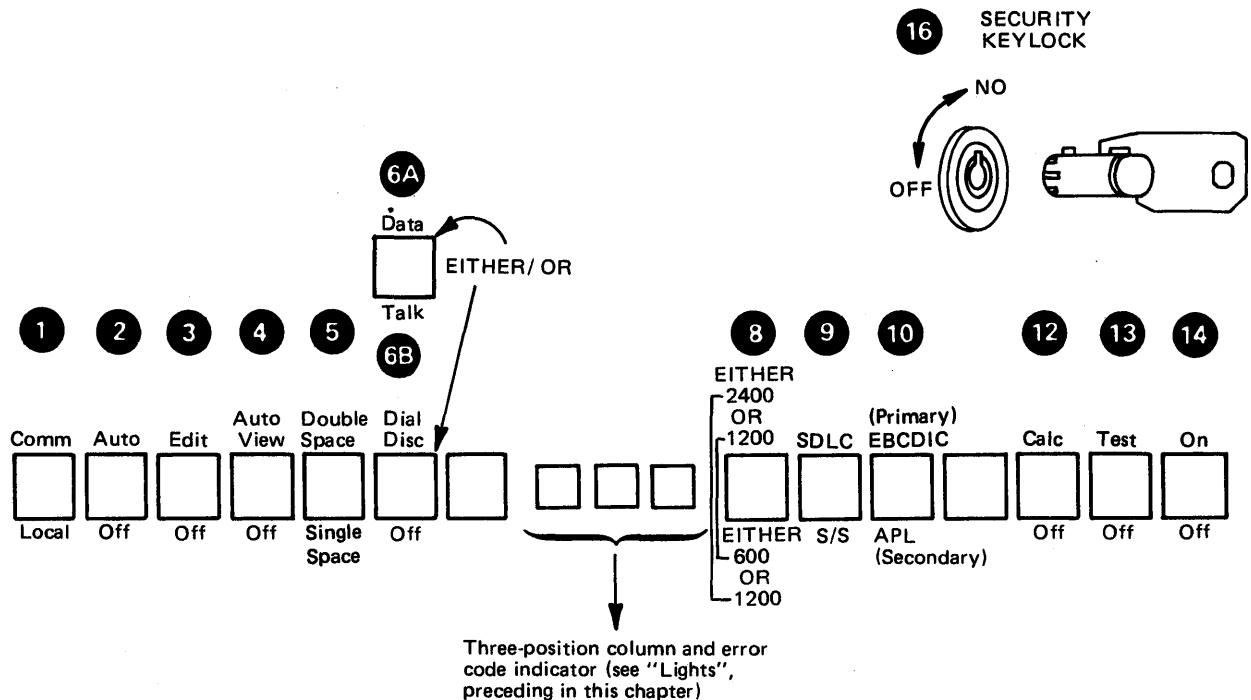
## 12 *Weak Signal*

This light indicates that the communication signal being received via the acoustic coupler is weak. This condition indicates that re-dialing may be necessary.

## 15 Three-Position Column and Error Code Indicator (ANR)

This indicator normally shows the printer's next print position. Under error conditions (when the System Check light or the Test light is on), it shows the error code.

### Switches (Illustration)



## 1 Communicate/Local (Comm/Local) (Standard)

This switch places the terminal in either local or communicate mode. It is operable at any time except when the terminal is in local mode with the calculate switch set to Calc. The calculate switch must be turned off before the terminal is changed from local to communicate mode.

## 2 Auto (Standard)

With this switch in the Auto position, the 3767 has the following transmission characteristics in SDLC mode:

- A message containing up to one line of data can be entered from the keyboard.
- The Carrier Return key causes transmission of the buffer contents and the 'end of message' (EOM) signal, in addition to the 'new line' (NL) character.
- The Form Feed Key causes transmission of the buffer contents and the 'end of message' (EOM) signal in addition to the 'Form Feed' (FF) character. This is true only if the Vertical Forms Control feature is installed.
- The EOB and EOM Keys cause transmission of the buffer contents.
- Single line editing can be performed.

With this switch in the OFF position, the 3767 has the following transmission characteristics in SDLC mode:

- Multiple blocks of multiple-line messages can be entered from the keyboard.
- The EOB key causes transmission of the buffer contents and the 'EOB' signal to the CPU. This does not give the CPU an opportunity to transmit.
- The EOM key causes transmission of the buffer contents and the 'EOM' signal to the CPU. This gives the CPU an opportunity to transmit.



This switch performs the same function as the Auto EOB switch on the 2740-1 if the 2740-1 Start Stop line control has been specified.

**3 Edit (Buffered SDLC)**

This switch enables total text editing during a keyboard-to-printer operation when the terminal is in local mode. Buffered data that is edited when the 3767 is in local mode may be printed to obtain clean copy, but cannot be transmitted. In communicate mode, this switch suppresses automatic transmission of a message segment so that a full buffer segment can be edited before it is transmitted.

**(2740-2)**

This switch enables total text editing during a keyboard-to-printer operation when the terminal is in local or communicate mode. Buffered data that is edited when the 3767 is in local mode may be printed to obtain a clean copy and also transmitted.

**4 Auto View (Standard)**

When this switch is set to Auto View, the print head automatically moves to the right of the last character printed during keyboard data entry. This makes it possible for each key entry to be visually verified before the next key is pressed. Auto View is active in communicate mode, when the terminal is in the transmit state, and in local mode, during keyboard-to-printer operations. Auto View does not function past print position 124.

**5 Double Space/Single Space (Standard)**

This switch causes single (6 print lines per inch) or double (3 print lines per inch) line feed, when it is set to the desired position.

**6A Data/Talk (Non-USA Only—Except Germany)**

This switch is used to disconnect the terminal from a switched network. Either this switch or the Dial Disc switch (described next) may be specified, but not both.

**6B Dial Disc (Germany Only)**

This switch is a momentary-type (spring-loaded) switch. When it is momentarily set to the Dial Disc position, it causes the terminal to be disconnected from a switched network. Before this switch is operated, the communicating session must be terminated by either the CPU or the terminal.

**8 Line Speed**

Set this switch to the line speed you are using. The 1200/2400 bps selection is for use with the IBM 3872 modem; 600/1200 bps operation is for non-USA countries only.

**9 SDLC/SS (Start-Stop Feature)**

This switch selects the line control desired, either SDLC or start-stop. It must be set to the desired line control before power is turned on, since it functions to change the line control only during the power-on sequence. After power is up, changing the switch setting has no effect on line control.

**10 Primary/Secondary (Alternate Character Set Feature)**

This switch enables the user of a 3767 with the Alternate Character Set feature installed to change character sets by setting the switch to the desired position. A card is supplied which illustrates the alternate character set with decals. These decals may be removed from the card and attached to the front of the appropriate keys.

**12 Calculation (Calculate-Scientific Feature)**

This switch is operative when the terminal is in local mode. When it is set to the Calc position, the terminal can be used as a desk calculator.

**13 Test (Standard)**

This switch is a momentary-type switch and is operable at any time. When it is momentarily set to the Test position, it causes all lights except the Upper Case, Data Set Ready/Weak Signal, and End Form lights to come on, and when it is released, it causes the terminal's automatic test procedure to test the terminal. When the test has been completed, the terminal returns to the same condition as after a power-on reset. This switch should normally be used when the 3767 is in local mode, to avoid possible communication interference.

**Note:** Paper must be inserted before running this test because printing will occur.

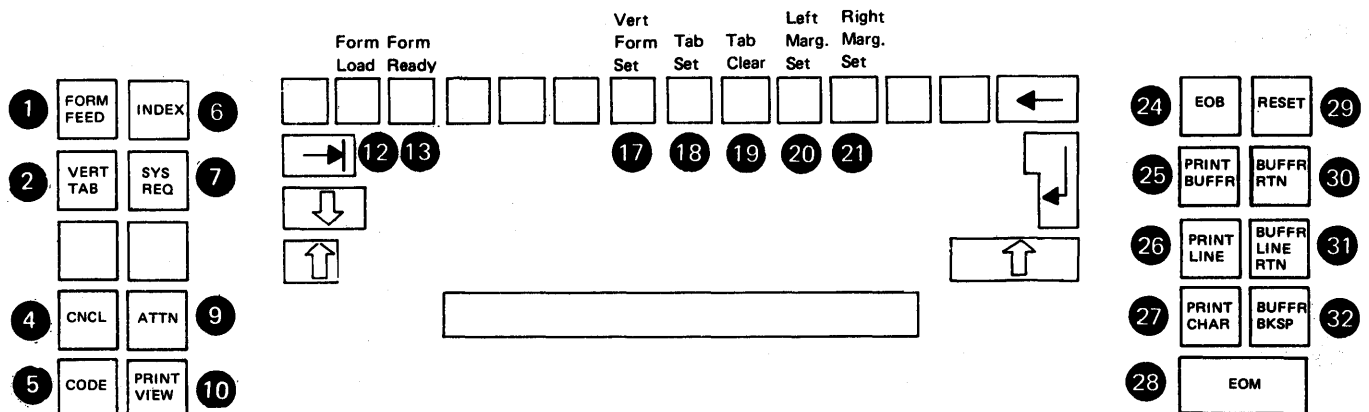
**14 On/Off (Power) (Standard)**

This switch, when turned on, supplies power to the 3767; it also initiates a power-on reset. After power is turned on, there is a 20-30 second delay (while terminal self-testing occurs) before the terminal becomes operable. Power is turned off at the terminal when this switch is set to the Off position.

**16 Security Keylock (Special Feature)**

This key-switch, when not turned on, prevents unauthorized use of the terminal. Each terminal has a unique key.

**Keys (Illustration)**



*Keyboard Control Keys*

- Shift (↑)
- Lock (↓)
- Print Control Keys*
- Return (↵)
- Space (␣)
- Backspace (←)
- Index
- Tab (→)
- Form Feed
- Vertical Tab (VERT TAB)
- Print View
- Reset Key*
- RESET

*Communication Control Keys*

- Return (↵)
- FORM FEED
- End of Block (EOB)
- End of Message (EOM)
- Attention (ATTN)
- Cancel (CNCL)
- System Request (SYS REQ)
- Combination Function Keys*
- Press the CODE Key and one of the following Keys:
- Form Load
- Form Ready
- Vertical Form Set

- Tab Set
- Tab Clear
- Left Margin Set
- Right Margin Set

*Buffer Editing Keys*

- Print Buffer (PRINT BFFR)
- Print a Line (PRINT LINE)
- Print a Character (PRINT CHAR)
- Buffer Return (BUFFER RTN)
- Buffer Line Return (BUFFR LINE RTN)
- Buffer Backspace (BUFFR BKSP)

## 1 **Form Feed (VFC Feature)**

This key, when pressed, causes the paper to advance to the left margin of the first print line of the next page. It also transmits the form feed code, if the terminal is in transmit status. In SDLC mode with the Auto switch on, this key also performs the function of the EOM key.

## 2 **Vertical Tab (VFC Feature)**

This key, when pressed, causes the paper to advance to the next vertical tab stop position. It also transmits the vertical tab (VT) code, if the terminal is in transmit status. The print column position does not change. If no vertical tab stop positions are defined, a line feed occurs, and the VT code is transmitted. If this key is pressed when the form is past the last vertical tab stop position, the Operation Check light comes on.

## 4 **Cancel**

This key, when pressed, does the following, according to the specified line control:

- SDLC—When pressed while the terminal is in the receive state, stops the printing and transmits an error response to the CPU. When it is pressed while the terminal is in the transmit state, this key clears the buffer and causes the CPU to discard previously transmitted message segments.
- 2740-2—During enter operations, clears the buffer.

## 5 **Code**

This key is used in conjunction with certain other data keys. These data keys have their code function printed on the terminal case just above the key, as follows:

Form Load	Tab Set
Form Ready	Tab Clear
Vert Form Set	Left Margin Set
	Right Margin Set

To activate these data key code functions, press the desired data key while pressing the CODE key. Refer to the descriptions of these Keys, following in this chapter.

## 6 **Index**

This key, when pressed, causes the form to advance one line and also causes the Line Feed (LF) code to be generated. When the VFC feature is installed, if this key is pressed when the form is positioned at the bottom margin, the form does not advance, and the Operation Check light comes on. When pressed during a calculate operation, this key causes a new line function.

## 7 **System Request**

This key, when pressed, does the following, according to the specified line control that is being used:

- SDLC—Causes the terminal, through predefined procedures, to communicate with the CPU for various services, such as initiating communications and terminating communications.
- 2740-1 Point-to-Point\*—Causes the terminal, when it is in standby status, to transmit an 'end of address' signal; the terminal then shifts to transmit status.
- 2740-1 Station Control\*—Places the terminal in bid status. An audible tone sounds, and the Proceed light comes on when the terminal is polled.
- 2740-2\*—Turns off the Proceed light and causes the buffer contents to be transmitted when the terminal is polled. After completing the transmission, the terminal enters standby status.

\*The function of this key is the same as that of the Bid key on the 2740 terminals.

## 9 **Attention**

This key, when pressed, does the following, according to the specified line control:

- SDLC—Causes special attention information to be transmitted to the CPU, regardless of the terminal's state. The use of this information depends upon the user's application.
- 2740-2—Provides the same function as the 2740-2 Enter key.
- 2741—Causes an 'end-of-transmission' signal (when the terminal is in transmit status) or an 'interrupt' signal (when the terminal is in receive status) to be transmitted.

## 10 **Print View**

This key, when pressed during a keyboard data entry operation, causes the print head to move to the right so that the last character entered is visible. The mechanical print position indicator is also aligned with the next print position. Print view does not function past print position 124. The print head returns to the correct printing position when a character key is pressed.

Additional functions of the Print View key for the following operations are:

- 2740-1 with Station Control—Pressing the Print View key resets a 15-second time-out period and causes a shift character to be transmitted.
- 2740-2—Pressing the Print View key resets a 15-second time-out period. No shift characters are inserted into the buffer.

## 12 **Form Load**

This key must be used in conjunction with the CODE key. When the CODE and Form Load keys are pressed simultaneously, the print head moves to the left so that a new form can be loaded. To increase ribbon life, these keys should be pressed before power is turned off.

## 13 **Form Ready**

This key must be used in conjunction with the CODE key. When the CODE and Form Ready keys are pressed simultaneously, the print head moves to the position it occupied before the Form Load key was pressed.

## 17 **Vertical Form Set (VFC Feature)**

This key must be used in conjunction with the CODE key, to provide the vertical format function. This function is available only with the VFC feature.

When the CODE and Vertical Form Set keys are pressed simultaneously, the terminal enters vertical format setting status. The page size (total number of print lines), VFC vertical tab positions, and the bottom margin may then be specified.

## 18 **Tab Set**

This key must be used with the CODE key. When the CODE and Tab Set keys are pressed simultaneously, a horizontal tab stop is set at the current position indicated by the column indicator.

## 19 **Tab Clear**

This key must be used with the CODE key. When the CODE and Tab Clear keys are pressed simultaneously, the horizontal tab stop at the current position indicated by the column indicator is cleared.

## 20 **Left Margin Set**

This key must be used with the CODE key. When the CODE and Left Margin Set keys are pressed simultaneously, the left margin is set at the current position indicated by the column indicator. This automatically clears any previous setting of the left margin.

**21** *Right Margin Set*

This key must be used with the CODE key. When the CODE and Right Margin Set keys are pressed simultaneously, the right margin is set at the current position indicated by the column indicator. This automatically clears any previous setting of the right margin. During receiving or keying operations the print head is not stopped by the right margin.

**24** *EOB (End of Block)*

This key, when pressed, does the following, under the specified mode:

- SDLC—Transmits all buffered data and an EOB signal. The operator can continue to key in data as long as the Proceed light is on.
- 2740-1—Transmits an 'end of message block' signal to the CPU, which causes the CPU to check the message block. The operator can key in more data after receiving a positive acknowledgment from the CPU to the previously transmitted data.
- 2740-2—(Same as for 2740-1) except that the terminal automatically transmits an EOT signal after receiving a positive acknowledgment from the CPU.

**25** *Print Buffer (Buffer Feature)*

This key, when pressed, causes the contents of the buffer between the edit pointer and the current pointer, to be printed. If this key is pressed immediately after the Buffer Return key is pressed, the entire buffer, up to the current pointer, will be printed.

**26** *Print Line (Buffer Feature)*

This key, when pressed, causes the contents of the buffer between the edit pointer and the next NL code character, to be printed. If the edit and current pointers are on the same line, the printout will stop at the location of the current pointer.

**27** *Print Character (Buffer Feature)*

This key, when pressed, causes the buffer character at the edit pointer's position to be printed. This key is a typamatic (repeating) key.

**28** *EOM (End of Message)*

This key, when pressed, does the following, according to the specified line control:

- SDLC—Causes all buffered data and End of Message information to be transmitted to the CPU. The keyboard condition (locked or unlocked) is specified by the CPU at the beginning of communications. For example, a keyboard condition might be specified as:
  - Permitting continuous entry of data from the keyboard, as long as no error or exception condition is detected
  - Permitting additional entry of data from the keyboard when a positive acknowledgment has been received for the previous message segment
  - Remaining locked after receiving a message from the CPU.
- 2740-1 or 2740-2—Informs the CPU that the terminal has completed transmitting. The terminal then enters standby status, and the keyboard is locked.

**29** *Reset*

This key, when pressed, does the following, according to the specified line control:

- SDLC and Start-Stop—Turns off the Operation Check light and/or the System Check light, if either of these is on.
- 2740-1/2—Performs the same functions as the RST key on the 2740-1 and the Reset key on the 2740-2.
- 2741—Resets error conditions detected while the terminal is receiving data.

**30** *Buffer Return*

This key, when pressed, causes the edit pointer to point to the first position of the buffer. It also causes the printer to start a new line.

**31** *Buffer Line Return (Buffer Feature)*

This key, when pressed, causes the following to occur:

- The edit pointer points to the first position of the current line.
- A new print line is started.

Each additional pressing of this key causes the edit pointer to go back by one line. The Operation Check light comes on if the operator attempts to go back past the beginning of the buffer. The light goes off if the RESET key, any data key, or one of the print keys is pressed.

**32** *Buffer Backspace*

This key, when pressed, causes the following to occur:

- The edit pointer decrements by one position.
- The print position decrements by one position.

If the operator backspaces over an NL or FF code or past the beginning of the buffer, the Operation Check light comes on. The light goes off if the RESET key, any data key, or any buffer key is pressed.



## Chapter 5. Non-USA Considerations

Special consideration has been given to the unique requirements of non-USA countries, as described in the following text.

### Power Supply

Power supplies for the 3767 are available to match the following power sources:

100 Vac	}	50 Hz
110/112.5 Vac		
123.5 Vac		
220 Vac		
235/240 Vac		
100 Vac	}	60 Hz
115 Vac		
220 Vac		

### Keyboard and Printer Requirements

The following keyboard nomenclature is available:

APL (USA)*	Finland
APL (WT)*	France
ASCII	Italy
Correspondence (USA)	Katakana
EBCDIC (JAPAN)	Norway
EBCDIC (USA)	Portugal
International EBCDIC (WT)	Spain
Austria/Germany	Spanish-Speaking
Belgium	Sweden
Brazil	United Kingdom
Denmark	

\*Decals only (alternate character set).

Refer to Appendix A, following in this manual, for illustrations of these keyboards.





# Appendix A. Keyboard Layouts and Code Charts

## Keyboards

Variations in keyboard layout are shown on the following pages.

On some keyboards for non-USA countries, certain character graphics are missing whose line codes are required for start-stop operation. The codes for these characters may be transmitted by pressing the key, whose number is shown in parentheses following "Missing Characters" for that keyboard.

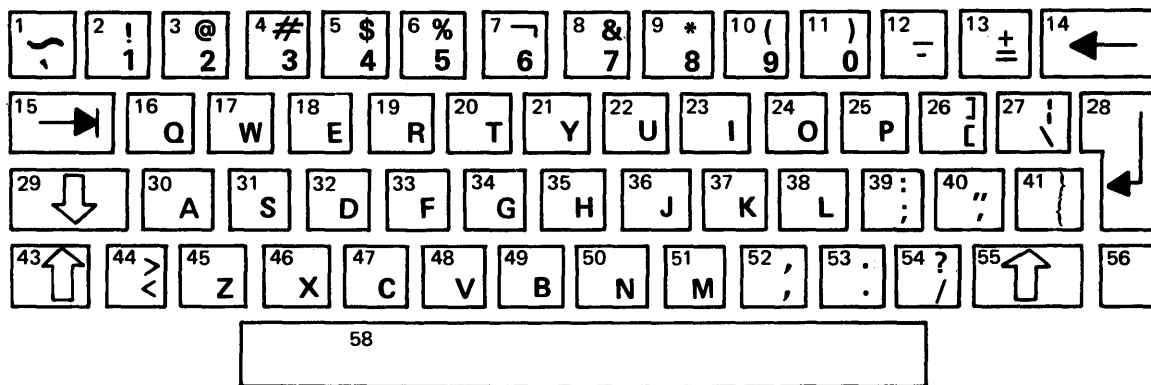


Figure A-1. ASCII

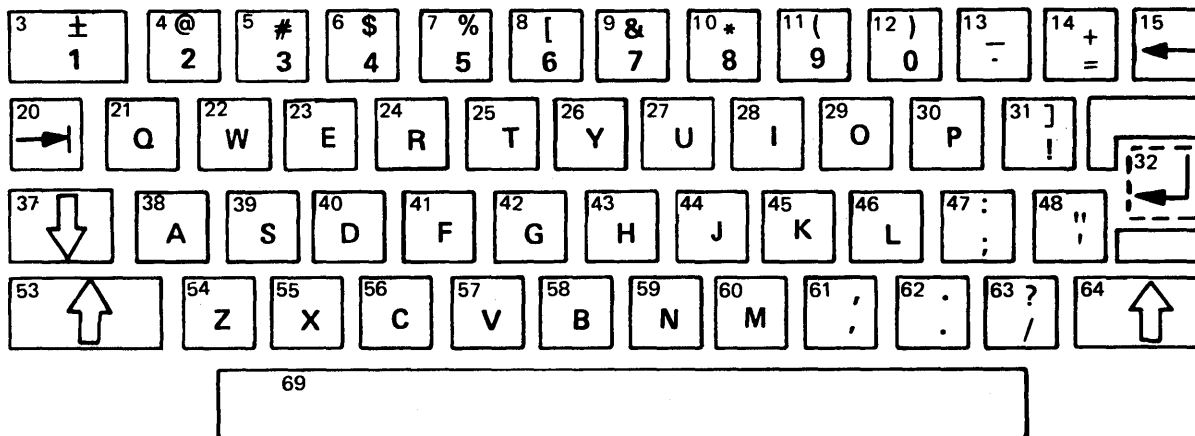
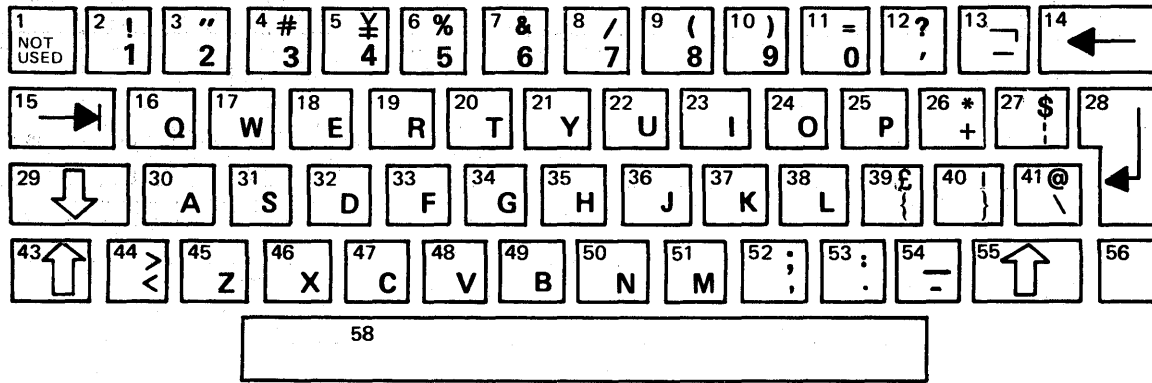


Figure A-2. CORRESPONDENCE (USA)



With Start-Stop Control:  
 Missing Graphics: none  
 Inactive Graphics: - \$ ' { }

Figure A-3. EBCDIC (JAPAN)

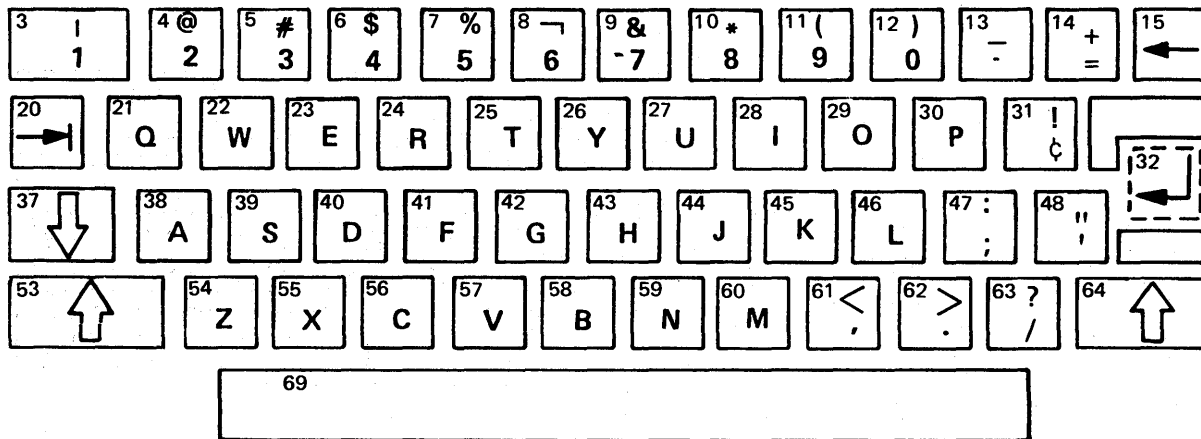
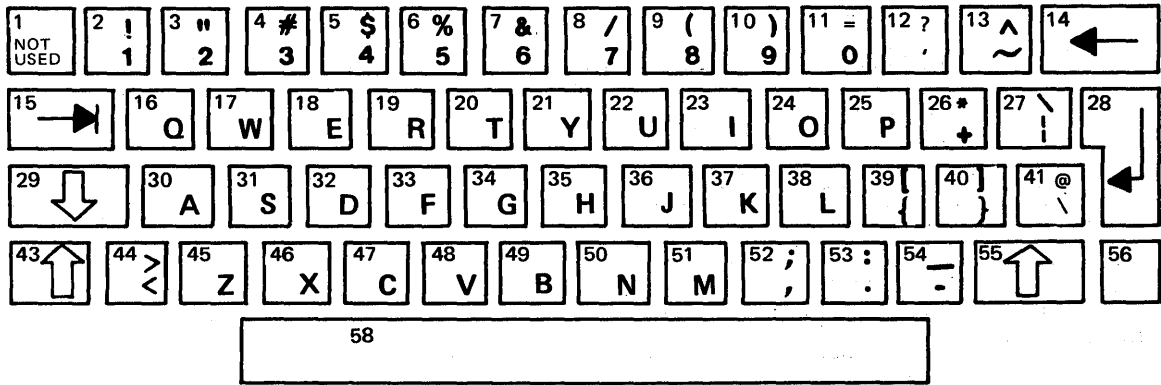
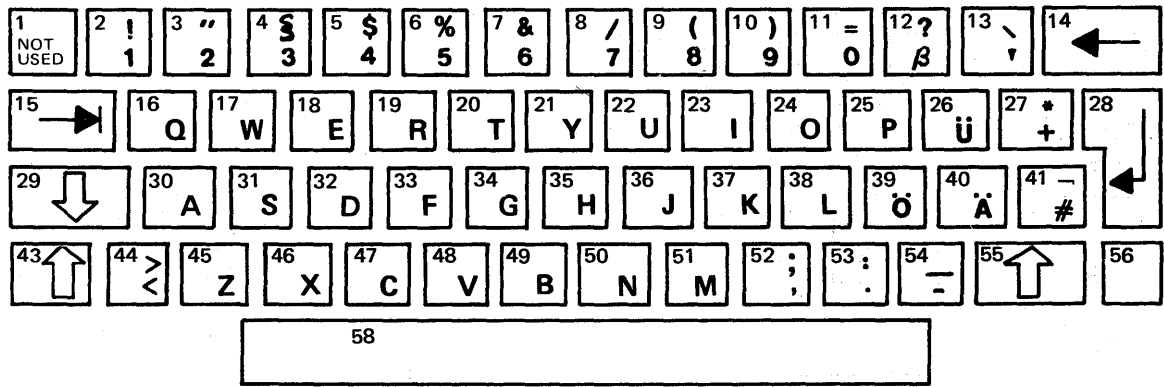


Figure A-4. EBCDIC (USA)



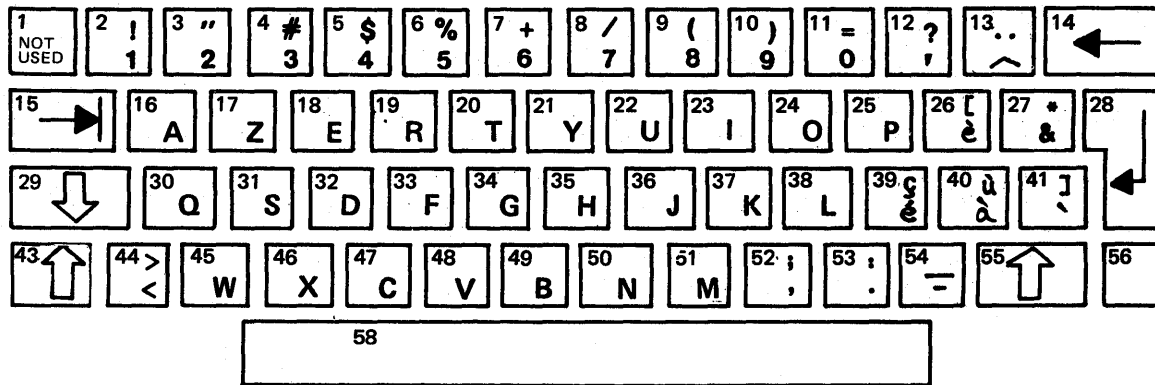
With start-stop line control:  
 Missing Graphics: | (40U) ◐ (39U) ◑ (13U)  
 Inactive Graphics: ~ \ | [ ] { } ` ^

Figure A-5. INTERNATIONAL EBCDIC (World Trade)



With start-stop line control:  
 Missing Graphics: | (4U) @ (39L) ◐ (39U)  
 Inactive Graphics: ß ` § Ä ü Ö ö Ü ä

Figure A-6. AUSTRIA/GERMANY



With start-stop line control:

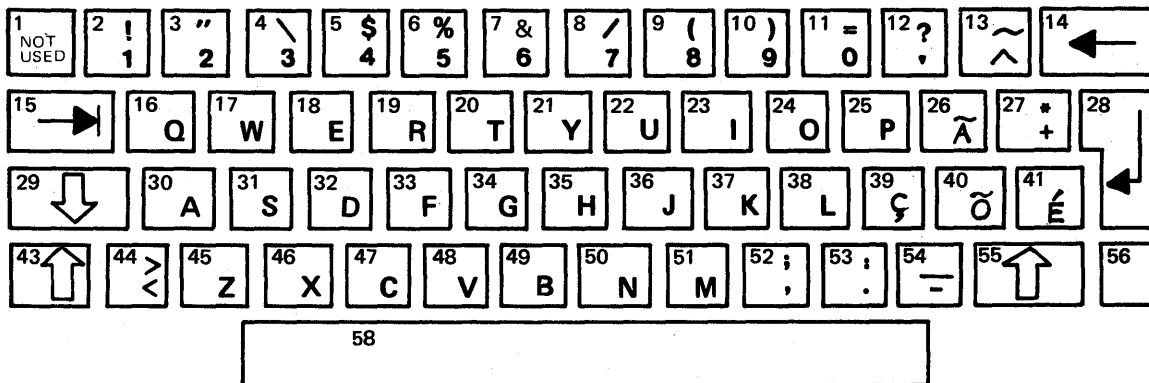
Missing Graphics:

| (2U) → (13L) € (26U) @ (40L) !(4IU)

Inactive Graphics:

.. ^ ` à é ç è [ ` ] `

Figure A-7. BELGIUM



With start-stop line control:

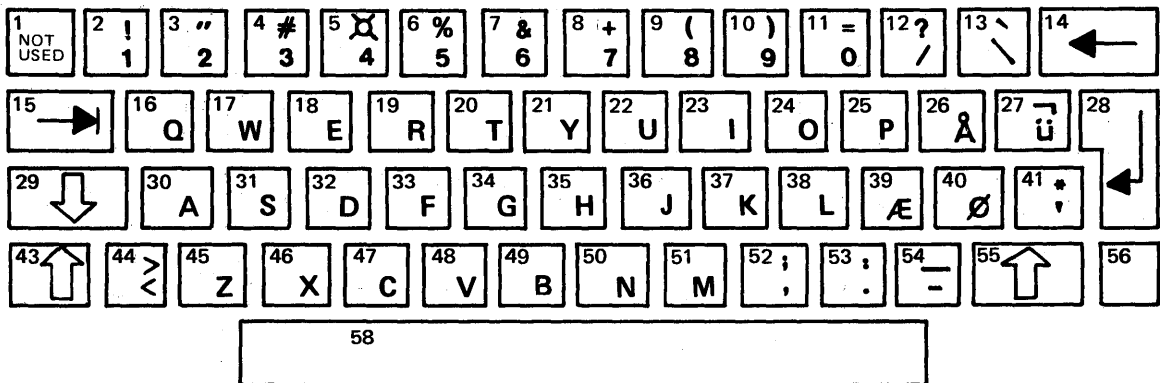
Missing Graphics:

| (2U) → (13L)

Inactive Graphics:

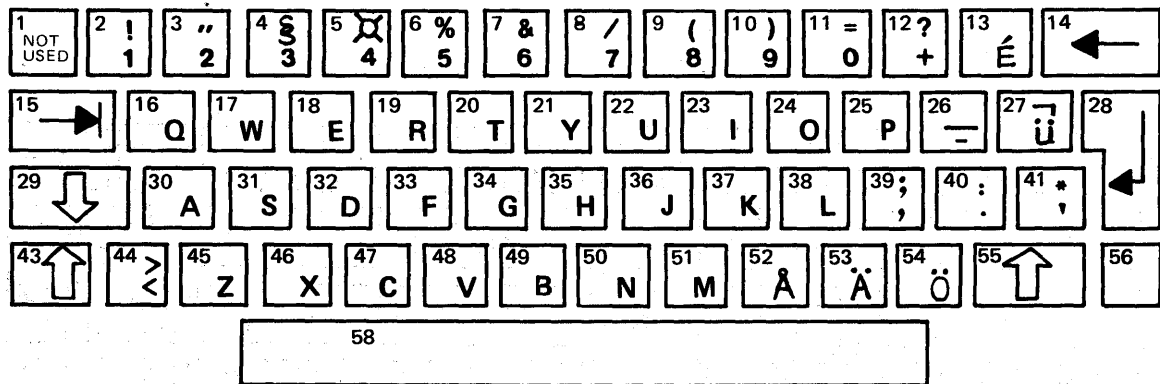
\ ~ " \$ É ! ^ é

Figure A-8. BRAZIL



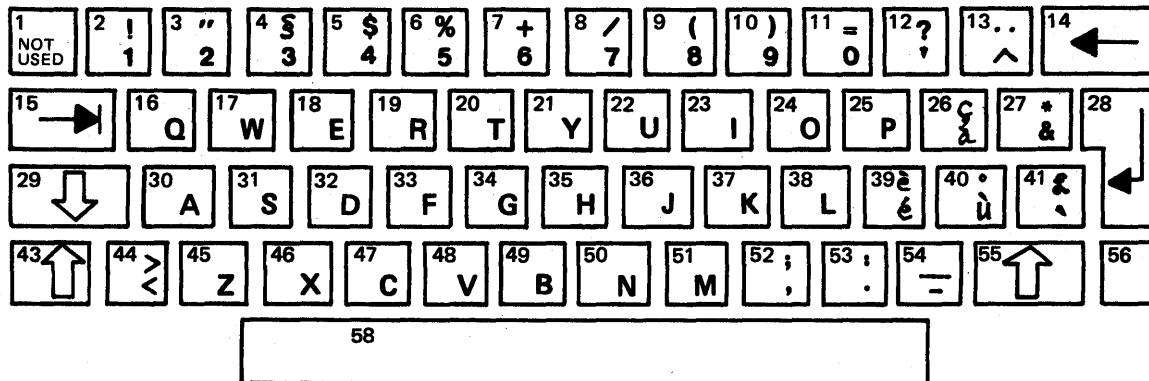
With start-stop line control:  
 Missing Graphics: none  
 Inactive Graphics: \ ' ü " # ✕

Figure A-9. DENMARK



With start-stop line control:  
 Missing Graphics: none  
 Inactive Graphics: É ü " š ✕ é

Figure A-10. FINLAND



With start-stop line control:

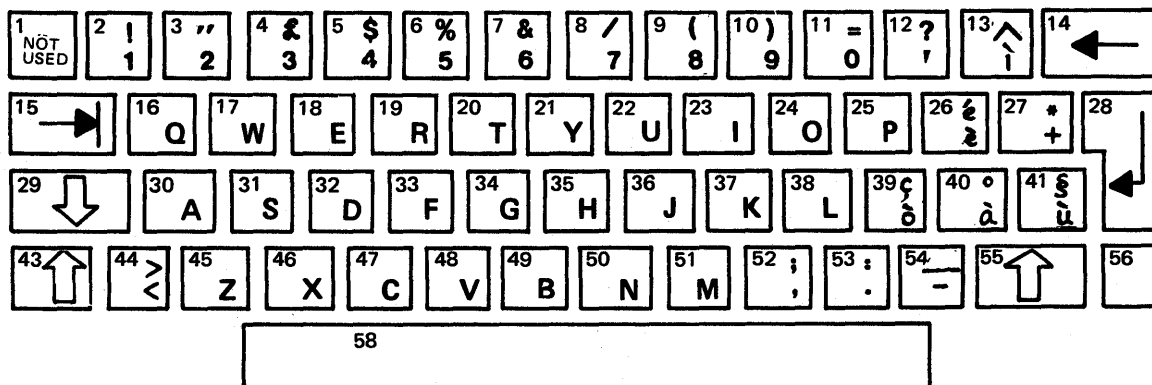
Missing Graphics:

Ⓒ (40U) | (2U) ¬ (13L) # (41U) @ (26L) ! (4U)

Inactive Graphics:

à £ ° ^ § ç é ù è …

Figure A-11. FRANCE



With start-stop line control:

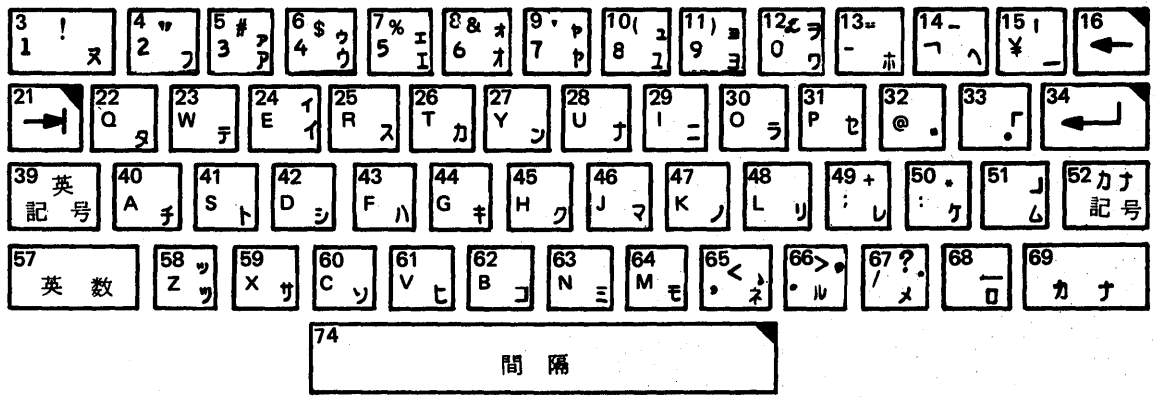
Missing Graphics:

# (4U) | (41U) ¬ (13U) @ (40U) Ⓒ (39U)

Inactive Graphics:

£ ì é è ç ò ° à § ù ^

Figure A-12. ITALY



- 16 Back Space
- 34 New Line
- 39 Alpha Symbol Shift
- 52 Katakana Symbol Shift
- 57 Alphanumeric Shift
- 69 Katakana Shift
- 74 Space
  
- 9 Apostrophe
- 13 Minus
- 14 Over Line
- 15 Cho-on
- 68 Under Line
- 65 Comma
- 66 Katakana Period

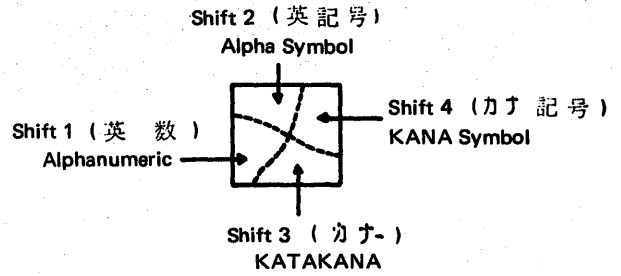
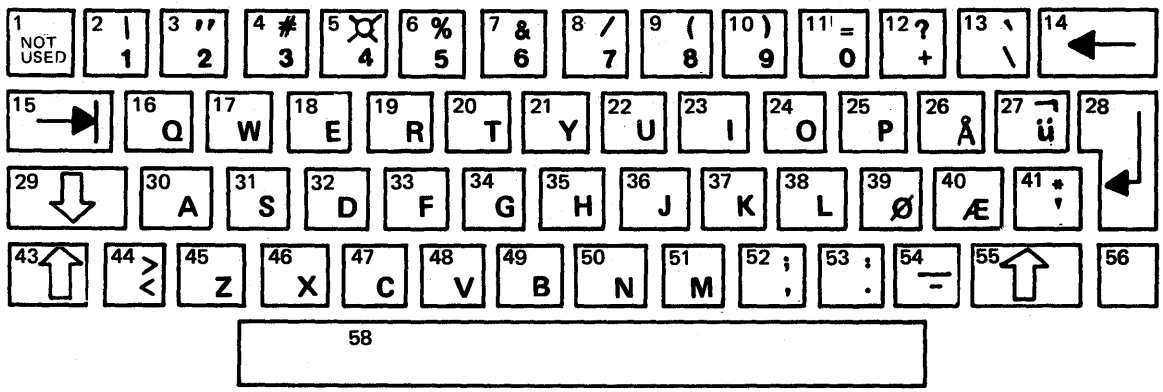


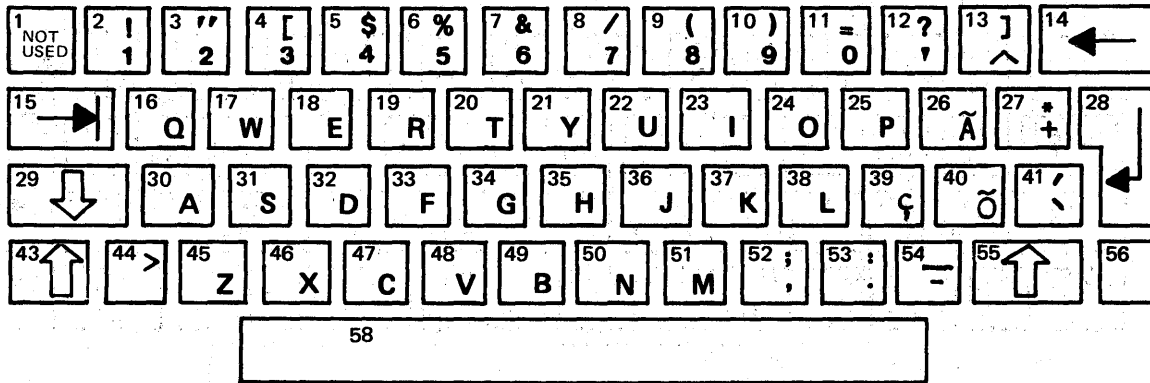
Figure A-13. KATAKANA



With start-stop line control:  
 Missing Graphics: none  
 Inactive Graphics: \ ' ü " # ✕

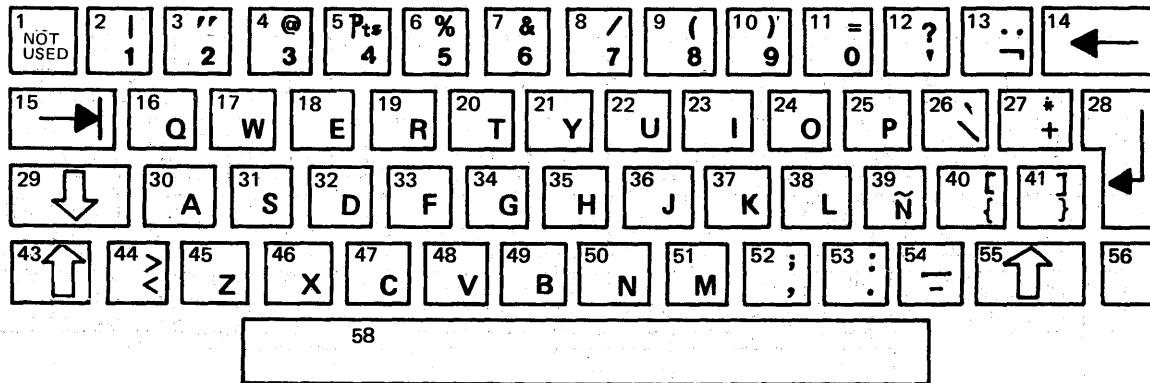
Figure A-14. NORWAY





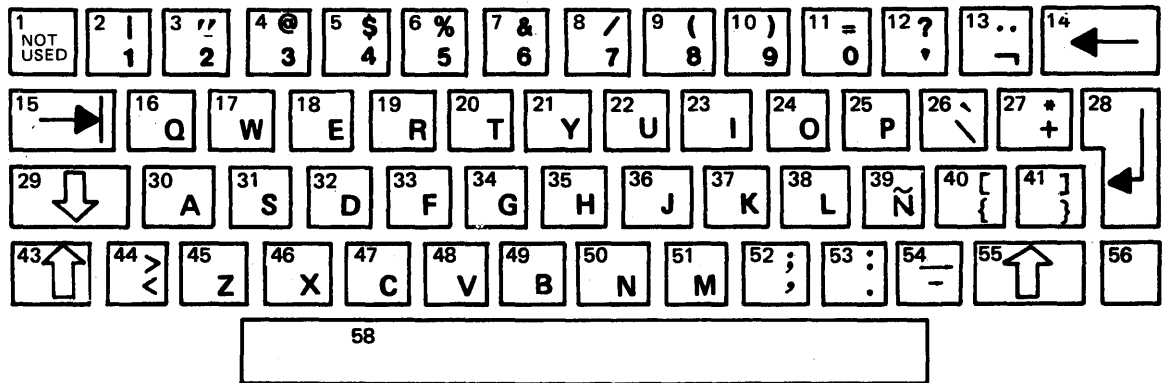
With start-stop line control:  
 Missing Graphics: |(13U) (13L) (4U)  
 Inactive Graphics: [ ] ^ ç ã õ

Figure A-15. PORTUGAL



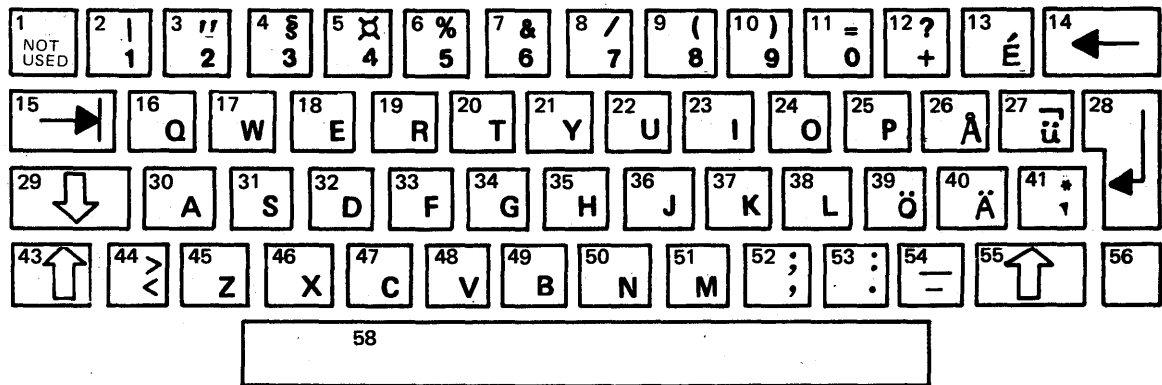
With start-stop line control:  
 Missing Graphics: ! (41U) (40U)  
 Inactive Graphics: { } .. \ [ ] "

Figure A-16. SPAIN



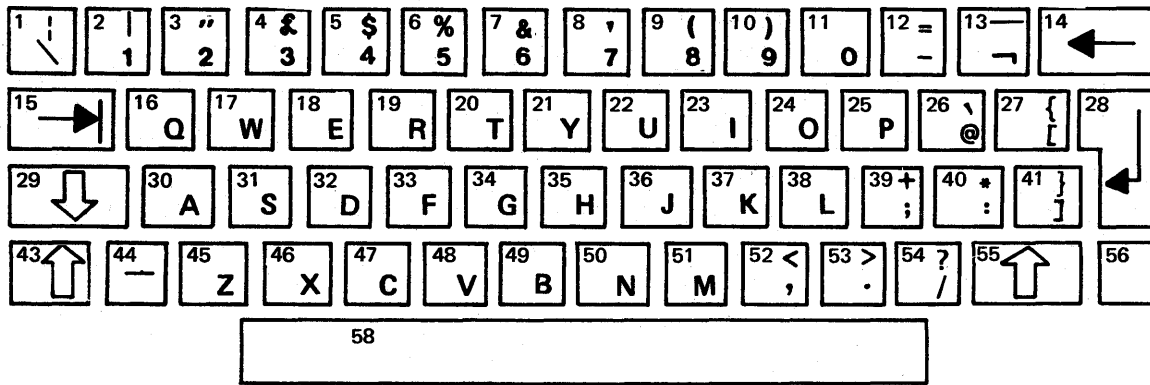
With start-stop line control:  
 Missing Graphics: ! (41U) ¢ (40U)  
 Inactive Graphics: { } · · \ " [ ]

Figure A-17. SPANISH SPEAKING



With start-stop line control:  
 Missing Graphics: none  
 Inactive Graphics: É ü " § ¤ é

Figure A-18. SWEDEN



With start-stop line control:  
 Missing Graphics: ≠(27L)!(41L)  
 Inactive Graphics: { } ' \ - [ ] !

Figure A-19. UNITED KINGDOM

## Code Charts

### Legend:

**KBD** = Key Position

**EBCDIC** = EBCDIC Line Code (Hex)

**S** = Shift

**S-S LC** = Start-Stop Line Code

**NU** = Not Used

**IA** = Inactive

**⌘** = Print Graphic of Start-Stop Line Control

KBD	Lowercase			Uppercase		
	GRAPHIC	S	S-S-LC	GRAPHIC	S	S-S-LC
3	1	L	1	“	U	1
4	2	L	2	”	U	2
5	3	L	21C	<	U	21C
6	4	L	4	≤	U	4
7	5	L	41C	=	U	41C
8	6	L	42C	≥	U	42C
9	7	L	421	>	U	421
10	8	L	8	≠	U	8
11	9	L	81C	v	U	81C
12	0	L	82C	^	U	82C
13	+	L	B	-	U	B
14	x	L	BAC	÷	U	BAC
21	Q	L	B8C	?	U	B8C
22	W	L	A42	ω	U	A42
23	E	L	BA41C	ε	U	BA41C
24	R	L	B81	ρ	U	B81
25	T	L	A21	~	U	A21
26	Y	L	A8C	↑	U	A8C
27	U	L	A4C	↓	U	A4C
28	I	L	BA81C	ı	U	BA81C
29	O	L	B42	o	U	B42
30	P	L	B421C	*	U	B421C
31	←	L	A	→	U	A
38	A	L	BA1	α	U	BA1
39	S	L	A2C	Γ	U	A2C
40	D	L	BA4	└	U	BA4
41	F	L	BA42C	┘	U	BA42C
42	G	L	BA421	∇	U	BA421
43	H	L	BA8	Δ	U	BA8
44	J	L	B1C	◦	U	B1C
45	K	L	B2C	◦	U	B2C
46	L	L	B21	◻	U	B21
47	[	L	B821C	(	U	B821C
48	]	L	821	)	U	821
54	Z	L	A81	c	U	A81
55	X	L	A421C	∩	U	A421C
56	C	L	BA21C	∪	U	BA21C
57	V	L	A41	⊥	U	A41
58	B	L	BA2	⊥	U	BA2
59	N	L	B41	T	U	B41
60	M	L	B4C		U	B4C
61	•	L	A821C	:	U	A821C
62	•	L	BA821	:	U	BA821
63	/	L	A1C	\	U	A1C

Figure A-20. Code Chart-APL

KBD	Lowercase		Uppercase	
	GRAPHIC	ASCII	GRAPHIC	ASCII
1	\	6/0	~	7/14
2	1	3/1	!	2/1
3	2	3/2	@	4/0
4	3	3/3	#	2/3
5	4	3/4	\$	2/4
6	5	3/5	%	2/5
7	6	3/6	⌋	
8	7	3/7	&	2/6
9	8	3/8	*	2/10
10	9	3/9	(	2/8
11	0	3/0	)	2/9
12	-	2/13	-	5/15
13	=	3/13	+	2/11
16	q	7/1	Q	5/1
17	w	7/7	W	5/7
18	e	6/5	E	4/5
19	r	7/2	R	5/2
20	t	7/4	T	5/4
21	y	7/9	Y	5/9
22	u	7/5	U	5/5
23	i	6/9	I	4/9
24	o	6/15	O	4/15
25	p	7/0	P	5/0
26	[	5/11	]	5/13
27	\	5/12	:	7/12
30	a	6/1	A	4/1
31	s	7/3	S	5/3
32	d	6/4	D	4/4
33	f	6/6	F	4/6
34	g	6/7	G	4/7
35	h	6/8	H	4/8
36	j	6/10	J	4/10
37	k	6/11	K	4/11
38	l	6/12	L	4/12
39	;	3/11	:	3/10
40	'	2/7	"	2/2
41	{	7/11	}	7/13
44	<	3/12	>	3/14
45	z	7/10	Z	5/10
46	x	7/8	X	5/8
47	c	6/3	C	4/3
48	v	7/6	V	5/6
49	b	6/2	B	4/2
50	n	6/14	N	4/14
51	m	6/13	M	4/13
52	, comma	2/12	, comma	2/12
53	. period	2/14	. period	2/14
54	/	2/15	?	3/15

Figure A-21. Code Chart-ASCII

KBD	Lowercase			Uppercase		
	GRAPHIC	S	S-SLC	GRAPHIC	S	S-SLC
1	NU	-	-----	NU	-	-----
2	1	L	1	-	U	1
3	2	L	2	<	U	2
4	3	L	21C	<=	U	21C
5	4	L	4	=	U	4
6	5	L	41C	=>	U	41C
7	6	L	42C	>	U	42C
8	7	L	421	>#	U	421
9	8	L	8	v	U	8
10	9	L	81C	^	U	81C
11	0	L	82C	-	U	82C
12	+	L	B	-	U	B
13	x	L	BAC	÷?	U	BAC
16	Q	L	B8C	ω?	U	B8C
17	W	L	A42	ε	U	A42
18	E	L	BA41C	ε	U	BA41C
19	R	L	B81	p	U	B81
20	T	L	A21	~	U	A21
21	Y	L	A8C	↑	U	A8C
22	U	L	A4C	↓	U	A4C
23	I	L	BA81C	↑	U	BA81C
24	O	L	B42	o	U	B42
25	P	L	B421C	*	U	B421C
26	←	L	A	→	U	A
27	NU	-	-	NU	-	-
30	A	L	BA1	α	U	BA1
31	S	L	A2C	∟	U	A2C
32	D	L	BA4	∟	U	BA4
33	F	L	BA42C	∇	U	BA42C
34	G	L	BA421	∇	U	BA421
35	H	L	BA8	Δ	U	BA8
36	J	L	B1C	°	U	B1C
37	K	L	B2C	°	U	B2C
38	L	L	B21	□	U	B21
39	[	L	B821C	(	U	B821C
40	]	L	821	)	U	821
41	NU	-	-	NU	-	-
44	NU	-	-	NU	-	-
45	Z	L	A81	c	U	A81
46	X	L	A421C	∩	U	A421C
47	C	L	BA21C	∩	U	BA21C
48	V	L	A41	∩	U	A41
49	B	L	BA2	⊥	U	BA2
50	N	L	B41	T	U	B41
52	M	L	B4C		U	B4C
52	•	L	A821C	∴	U	A821C
53	•	L	BA821	∴	U	BA821
54	/	L	A1C	\	U	A1C
56	NU	-	-	NU	-	-

Figure A-22. Code Chart-World Trade Countries-APL

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
3	1	F1	L	1	†	9E	U	1
4	2	F2	L	2	@	7C	U	2
5	3	F3	L	21C	#	7B	U	21C
6	4	F4	L	8	\$	5B	U	8
7	5	F5	L	4	%	6C	U	4
8	6	F6	L	42C	[	4A	U	42C
9	7	F7	L	41C	&	50	U	41C
10	8	F8	L	421	*	5C	U	421
11	9	F9	L	821	(	4D	U	821
12	0	F0	L	81C	)	5D	U	81C
13	-	60	L	BA821	-	6D	U	BA821
14	=	7E	L	BA2	+	4E	U	BA2
21	q	98	L	BA42C	Q	D8	U	BA42C
22	w	A6	L	B821C	W	E6	U	B821C
23	e	85	L	A4C	E	C5	U	A4C
24	r	99	L	B41	R	D9	U	B41
25	t	A3	L	A	T	E3	U	A
26	y	A8	L	BA81C	Y	E8	U	BA81C
27	u	A4	L	A21	U	E4	U	A21
28	i	89	L	B42	I	C9	U	B42
29	o	96	L	B8C	O	D6	U	B8C
30	p	97	L	BA4	P	D7	U	BA4
31	!	4F	L	B	]	5A	U	B
38	a	81	L	B421C	A	C1	U	B421C
39	s	A2	L	B81	S	E2	U	B81
40	d	84	L	A41	D	C4	U	A41
41	f	86	L	BA21C	F	C6	U	BA21C
42	g	87	L	BA1	G	C7	U	BA1
43	h	88	L	A81	H	C8	U	A81
44	j	91	L	BAC	J	D1	U	BAC
45	k	92	L	A42	K	D2	U	A42
46	l	93	L	A8C	L	D3	U	A8C
47	;	5E	L	BA41C	:	7A	U	BA41C
48	,	7D	L	B4C	"	7F	U	B4C
54	z	A9	L	82C	Z	E9	U	82C
55	x	A7	L	A1C	X	E7	U	A1C
56	c	83	L	A421C	C	C3	U	A421C
57	v	A5	L	B21	V	E5	U	B21
58	b	82	L	A821C	B	C2	U	A821C
59	n	95	L	A2C	N	D5	U	A2C
60	m	94	L	B1C	M	D4	U	B1C
61	'	6B	L	BA421	'	6B	U	BA421
62	.	4B	L	B2C	.	4B	U	B2C
63	/	61	L	BA8	?	6F	U	BA8

Figure A-23. Code Chart-CORRESPONDENCE



KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	-	----	NU	--	-	----
3	1	F1	L	1		4F	U	A821C
4	2	F2	L	2	@	7C	L	A
5	3	F3	L	21C	#	7B	L	821
6	4	F4	L	4	\$	5B	L	B821C
7	5	F5	L	41C	%	6C	U	41C
8	6	F6	L	42C	]	5F	U	BA821
9	7	F7	L	421	&	50	L	BAC
10	8	F8	L	8	*	5C	U	8
11	9	F9	L	81C	(	4D	U	81C
12	0	F0	L	82C	)	5D	U	82C
13	-	60	L	B	-	6D	U	B
14	=	7E	U	1	+	4E	U	BAC
21	q	98	L	B8C	Q	D8	U	B8C
22	w	A6	L	A42	W	E6	U	A42
23	e	85	L	BA41C	E	C5	U	BA41C
24	r	99	L	B81	R	D9	U	B81
25	t	A3	L	A21	T	E3	U	A21
26	y	A8	L	A8C	Y	E8	U	A8C
27	u	A4	L	A4C	U	E4	U	A4C
28	i	89	L	BA81C	I	C9	U	BA81C
29	o	96	L	B42	O	D6	U	B42
30	p	97	L	B421C	P	D7	U	B421C
31	ø	4A	U	A	!	5A	U	B821C
38	a	81	L	BA1	A	C1	U	BA1
39	s	A2	L	A2C	S	E2	U	A2C
40	d	84	L	BA4	D	C4	U	BA4
41	f	86	L	BA42C	F	C6	U	BA42C
42	g	87	L	BA421	G	C7	U	BA421
43	h	88	L	BA8	H	C8	U	BA8
44	j	91	L	B1C	J	D1	U	B1C
45	k	92	L	B2C	K	D2	U	B2C
46	l	93	L	B21	L	D3	U	B21
47	;	5E	U	21C	:	7A	U	4
48	'	7D	U	42C	"	7F	U	821
54	z	A9	L	A81	Z	E9	U	A81
55	x	A7	L	A421C	X	E7	U	A421C
56	c	83	L	BA21C	C	C3	U	BA21C
57	v	A5	L	A41	V	E5	U	A41
58	b	82	L	BA2	B	C2	U	BA2
59	n	95	L	B41	N	D5	U	B41
60	m	94	L	B4C	M	D4	U	B4C
61	,	6B	L	A821C	<	4C	U	2
62	.	4B	L	BA821	>	6E	U	421
63	/	61	L	A1C	?	6F	U	A1C

Figure 24. Code Chart-EBCDIC (USA)

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	--	-----	NU	-----	--	-----
2	1	F1	L	1	!	5A	U	B821C
3	2	F2	L	2	"	7F	U	821
4	3	F3	L	21C	#	7B	L	821
5	4	F4	L	4	¥	5B	L	B821C
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	'	7D	U	42C	?	6F	U	A1C
13	-	A1		1A	┘	5F	U	BA821
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	+	4E	U	BAC	*	5C	U	8
27	!	6A		1A	\$	E0		1A
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	{	C0		1A	£	4A	U	A
40	}	D0		1A		4F	U	A821C
41	`	79		1A	@	7C	L	A
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	,	6B	L	A821C	;	5E	U	21C
53	.	4B	L	BA821	:	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	--	--	-----	NU	--	--	-----

Figure A-25. Code Chart EBCDIC (JAPAN)

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	---	-	-----	NU	-----	-	-----
2	1	F1	L	1	!	4F	U	B821C
3	2	F2	L	2	"	7F	U	821
4	3	F3	L	21C	#	7B	L	821
5	4	F4	L	4	\$	5B	L	B821C
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	'	7D	U	42C	?	6F	U	A1C
13	~	A1		IA	^ * 7	5F	U	BA821
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	+	4E	U	BAC	*	5C	U	8
27		6A		IA	\	E0		IA
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	{	C0		IA	[ * c	4A	U	A
40	}	D0		IA	] *	5A	U	A821C
41	\	79		IA	@	7C	L	A
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	.	6B	L	A821C	;	5E	U	21C
53	.	4B	L	BA821	:	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	---	-	-----	NU	---	-	-----

Figure A-26. Code Chart-INTERNATIONAL EBCDIC

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	-	-----	NU	--	-	-----
2	1	F1	L	1	!	4F	U	B821C
3	2	F2	L	2	"	7F	U	821
4	3	F3	L	21C	\$ * 1*	E0	U	A821C
5	4	F4	L	4	\$	5A	L	B821C
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	ß	A1		IA	?	6F	U	A1C
13	ı	7D	U	42C	`	79		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	z	A9	L	A81	Z	E9	U	A81
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	ü	D0		IA	U	5B		IA
27	+	4E	U	BAC	*	5C	U	8
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	ö * @*	6A	L	A	Ö * *	7C	U	A
40	ä	C0		IA	Ä	7B		IA
41	#	4A	L	821	┘	5F	U	BA821
44	<	4C	U	2	>	6E	U	421
45	Y	A8	L	A8C	Y	E8	U	A8C
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	•	6B	L	A821C	;	5E	U	21C
53	.	4B	L	BA821	:	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	--	-	-----	NU	--	-	-----

\*The Start-Stop code is transmitted, while the key-top graphic is printed.

Figure A-27. Code Chart-AUSTRIA/GERMANY

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	-	-----	NU	--	-	-----
2	1	F1	L	1	! * ! *	4F	U	A821C
3	2	F2	L	2	"	7F	U	821
4	3	F3	L	21C	#	7B	L	821
5	4	F4	L	4	\$	5B	L	B821C
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	+	4E	U	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	¶	7D	U	42C	?	6F	U	A1C
13	^ * ~	5F	U	BA821	..	A1		IA
16	a	81	L	BA1	A	C1	U	BA1
17	z	A9	L	A81	Z	E9	U	A81
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	e	D0		IA	[ * †	4A	U	A
27	&	50	L	BAC	*	5C	U	8
30	q	98	L	B8C	Q	D8	U	B8C
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	é	C0		IA	ç	E0		IA
40	à * @	7C	L	A	ù	6A		IA
41	·	79		IA	] * !	5A	U	B821C
44	<	4C	U	2	>	6E	U	421
45	w	A6	L	A42	W	E6	U	A42
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	•	6B	L	A821C	;	5E	U	21C
53	•	4B	L	BA821	:	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	--	-	-----	NU	--	-	-----

\*The Start-Stop code is transmitted, while the key-top graphic is printed.

Figure A-28. Code Chart-BELGIUM

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	-	----	NU	--	-	----
2	1	F1	L	1	! * I	4F	U	A821C
3	2	F2	L	2	"	7F		IA
4	3	F3	L	21C	\	E0		IA
5	4	F4	L	4	\$	5A		IA
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	•	7D	U	42C	?	6F	U	A1C
13	^ * ↵	5F	U	BA821	~	A1		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	ã	79	L	A	Ã	7C	U	A
27	+	4E	U	BAC	*	5C	U	8
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	ç	6A	L	B821C	Ç	5B	U	B821C
40	õ	C0	L	821	Õ	7B	U	821
41	é	D0		IA	É	4A		IA
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	,	6B	L	A821C	,	5E	U	21C
53	.	4B	L	BA821	.	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	--	-	----	NU	--	-	----

Figure A-29. Code Chart-BRAZIL

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	--	-----	NU	--	--	-----
2	1	F1	L	1		4F	U	A821C
3	2	F2	L	2	"	7F		IA
4	3	F3	L	21C	#	4A		IA
5	4	F4	L	4	⌘	5A		IA
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	+	4E	U	BAC
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	/	61	L	A1C	?	6F	U	A1C
13	\	E0		IA	`	79		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	ä	D0	L	B821C	Ä	5B	U	B821C
27	ü	A1		IA	Ü	5F	U	BA821
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	æ	C0	L	821	Æ	7B	U	821
40	ø	6A	L	A	Ø	7C	U	A
41	•	7D	U	42C	*	5C	U	8
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	/	6B	L	A821C	/	5E	U	21C
53	.	4B	L	BA821	.	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	--	--	-----	NU	--	--	-----

Figure A-30. Code Chart-DENMARK

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	--	----	NU	--	--	----
2	1	F1	L	1	ı	4F	U	A821C
3	2	F2	L	2	"	7F		IA
4	3	F3	L	21C	\$	4A		IA
5	4	F4	L	4	Ŧ	5A		IA
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	+	4E	U	BAC	?	6F	U	A1C
13	ë	79		IA	É	E0		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	-	60	L	B	-	6D	U	B
27	ü	A1		IA	ı	5F	U	BA821
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	•	6B	L	A821C	;	5E	U	21C
40	•	4B	L	BA821	:	7A	U	4
41	†	7D	U	42C	*	5C	U	8
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	ä	D0	L	B821C	Ä	5B	U	B821C
53	ä	C0	L	821	Ä	7B	U	821
54	ö	6A	L	A	Ö	7C	U	A
56	NU	--	--	----	NU	--	--	----

Figure A-31. Code Chart-FINLAND



KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	-	----	NU	--	-	----
2	1	F1	L	1	! * I	4F	U	A821C
3	2	F2	L	2	"	7F	U	821
4	3	F3	L	21C	\$ * !	5A	U	B821C
5	4	F4	L	4	\$	5B	L	B821C
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	+	4E	U	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	'	7D	U	42C	?	6F	U	A1C
13	^ * ▾	5F	U	BA821	..	A1		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	a * @	7C	L	A	Ç	E0		IA
27	&	50	L	BAC	*	5C	U	8
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	é	C0		IA	è	D0		IA
40	ù	6A		IA	° * ç	4A	U	A
41	¸	79		IA	£ * #	7B	L	821
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	¸	6B	L	A821C	;	5E	U	21C
53	.	4B	L	BA821	:	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	--	-	----	NU	--	-	----

Figure A-32. Code Chart-FRANCE

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	-	-----	NU	--	-	-----
2	1	F1	L	1	!	4F	U	B821C
3	2	F2	L	2	"	7F	U	821
4	3	F3	L	21C	£*#	7B	L	821
5	4	F4	L	4	\$	5B	L	B821C
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	•	7D	U	42C	?	6F	U	A1C
13	↑	A1		1A	^*~	5F	U	BA821
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85		1A	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	è	D0		1A	é	5A		1A
27	+	4E	U	BAC	*	5C	U	8
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	ò	6A		1A	ç*ç	E0	U	A
40	à	C0		1A	°*@	4A	L	A
41	ù	79		1A	§*l	7C	U	A821C
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	•	6B	L	A821C	;	5E	U	21C
53	•	4B	L	BA821	:	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	--	-	-----	NU	--	-	-----

Figure A-33. Code Chart-ITALY

KBD	Alphameric		Alpha Symbol		Katakana		Kana Symbol	
	GRAPHIC	BCDIC	GRAPHIC	EBCDIC	GRAPHIC	BCDIC	GRAPHIC	EBCDIC
3	1	F1	!	5A	ヌ	98	NU	---
4	2	F2	"	7F	フ	9F	NU	---
5	3	F3	#	7B	ア	81	ア	47
6	4	F4	\$	E0	ウ	83	ウ	49
7	5	F5	%	6C	エ	84	エ	51
8	6	F6	&	50	オ	85	オ	52
9	7	F7	'	7D	ヤ	A9	ヤ	53
10	8	F8	(	4D	ユ	AA	ユ	54
11	9	F9	)	5D	ヨ	AC	ヨ	55
12	0	F0	£	4A	ワ	BC	ヲ	46
13	-	60	=	7E	ホ	A3	NU	---
14	「	5F	-	A1	ハ	A2	NU	---
15	¥	5B		4F	ー	58	NU	---
22	Q	D8	NU	---	タ	91	NU	---
23	W	E6	NU	---	テ	94	NU	---
24	E	C5	NU	---	イ	82	イ	48
25	R	D9	NU	---	ス	8E	NU	---
26	T	E3	NU	---	カ	86	NU	---
27	Y	E8	NU	---	ン	BD	NU	---
28	U	E4	NU	---	ナ	96	NU	---
29	I	C9	NU	---	ニ	97	NU	---
30	O	D6	NU	---	ラ	AD	NU	---
31	P	D7	NU	---	セ	8F	NU	---
32	@	7C	NU	---	ッ	BE	NU	---
33	NU	---	NU	---	。	BF	「	42
40	A	C1	NU	---	チ	92	NU	---
41	S	E2	NU	---	ト	95	NU	---
42	D	C4	NU	---	シ	8D	NU	---
43	F	C6	NU	---	ハ	9D	NU	---
44	G	C7	NU	---	キ	87	NU	---
45	H	C8	NU	---	ク	88	NU	---
46	J	D1	NU	---	マ	A4	NU	---
47	K	D2	NU	---	ノ	9A	NU	---
48	L	D3	NU	---	リ	AE	NU	---
49	:	5E	+	4E	レ	BA	NU	---
50	:	7A	*	5C	ケ	89	NU	---
51	NU	---	NU	---	ム	A6	」	43
58	Z	E9	NU	---	ツ	93	ツ	56
59	X	E7	NU	---	サ	8C	NU	---
60	C	C3	NU	---	ソ	90	NU	---
61	V	E5	NU	---	ヒ	9E	NU	---
62	B	C2	NU	---	コ	8A	NU	---
63	N	D5	NU	---	ミ	A5	NU	---
64	M	D4	NU	---	モ	A8	NU	---
65	,	6B	<	4C	ネ	99	,	44
66	-	4B	>	6E	ル	AF	。	41
67	/	61	?	6F	メ	A7	.	45
68	NU	---	-	6D	□	BB	NU	---

Figure A-34. Code Chart-Katakana

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	-	-----	NU	--	-	-----
2	1	F1	L	1		4F	U	A821C
3	2	F2	L	2	#	7F		IA
4	3	F3	L	21C	#	4A		IA
5	4	F4	L	4	⌘	5A		IA
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	+	4E	U	BAC	?	6F	U	A1C
13	\	E0		IA	`	79		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	å	D0	L	B821C	Å	5B	U	B821C
27	ü	A1		IA	ü	5F	U	BA821
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	ø	6A	L	A	Ø	7C	U	A
40	æ	C0	L	821	Æ	7B	U	821
41	•	7D	U	42C	*	5C	U	8
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	•	6B	L	A821C	;	5E	U	21C
53	•	4B	L	BA821	:	7A	U	4
54	-	60	L	B	_	6D	U	B
56	NU	--	-	-----	NU	--	-	-----

Figure A-35. Code Chart-NORWAY

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	---	-	-----	NU	---	-	-----
2	1	F1	L	1	!	4F	U	B821C
3	2	F2	L	2	"	7F	U	821
4	3	F3	L	21C	[ * ¢	4A	U	A
5	4	F4	L	4	\$	5B	L	B821C
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C		50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	•	7D	U	42C	?	6F	U	A1C
13	^ * ↵	5F	U	BA821	] *	5A	U	A821C
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	ã	C0		IA	Ã	7B	L	821
27	+	4E	U	BAC	*	5C	U	8
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	ç	A1		IA	Ç	4C	U	2
40	õ	6A		IA	Õ	7C	L	A
41	¸	79		IA	¸	D0		IA
44	NU	---	-	-----	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	•	6B	L	A821C	;	5E	U	21C
53	•	4B	L	BA821	:	7A	U	4
54	-	60	L	B	_	6D	U	B
56	NU	---	-	-----	NU	---	-	-----

Figure A-36. Code Chart-PORTUGAL

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	---	-	-----	NU	--	-	-----
2	1	F1	L	1	!	4F	U	A821C
3	2	F2	L	2	"	7F		IA
4	3	F3	L	21C	@	7C	U	A
5	4	F4	L	4	Ps	5B	U	B821C
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	°	7D	U	42C	?	6F	U	A1C
13	┘	5F	U	BA821	..	A1		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	\	E0		IA	`	79		IA
27	+	4E	U	BAC	*	5C	U	8
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	ñ	6A	L	821	N	7B	U	821
40	{	C0		IA	[ * ¢	4A	L	A
41	}	D0		IA	] * !	5A	L	B821C
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	,	6B	L	A821C	;	5E	U	21C
53	.	4B	L	BA821	:	7A	U	4
54	-	60	L	B	_	6D	U	B
56	NU	---	-	-----	NU	--	-	-----

Figure A-37. Code Chart-SPAIN

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	-	-----	NU	--	-	-----
2	1	F1	L	1		4F	U	A821C
3	2	F2	L	2	"	7F		IA
4	3	F3	L	21C	@	7C	U	A
5	4	F4	L	4	\$	5B	U	B821C
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	•	7D	U	42C	?	6F	U	A1C
13	┌	5F	U	BA821	..	A1		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	\	E0		IA	'	79		IA
27	+	4E	U	BAC	*	5C	U	8
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	ñ	6A	L	821	Ñ	7B	U	821
40	{	C0		IA	[ * ¢	4A	L	A
41	}	D0		IA	] *!	5A	L	B821C
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	•	6B	L	A821C	;	5E	U	21C
53	•	4B	L	BA821	:	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	--	-	-----	NU	--	-	-----

Figure A-38. Code Chart-SPANISH-SPEAKING

KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	NU	--	-	-----	NU	--	-	-----
2	1	F1	L	1		4F	U	A821C
3	2	F2	L	2	"	7F		IA
4	3	F3	L	21C	§	4A		IA
5	4	F4	L	4	⌘	5A		IA
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	/	61	L	A1C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	=	7E	U	1
12	+	4E	U	BAC	?	6F	U	A1C
13	é	79		IA	É	E0		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	å	D0	L	B821C	Å	5B	U	B821C
27	ü	A1		IA	┘	5F	U	BA821
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	q	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	ö	6A	L	A	Ö	7C	U	A
40	ä	C0	L	821	Ä	7B	U	821
41	•	7D	U	42C	*	5C	U	8
44	<	4C	U	2	>	6E	U	421
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	,	6B	L	A821C	,	5E	U	21C
53	.	4B	L	BA821	.	7A	U	4
54	-	60	L	B	-	6D	U	B
56	NU	--	-	-----	NU	--	-	-----

Figure A-39. Code Chart-SWEDEN



KBD	Lowercase				Uppercase			
	GRAPHIC	EBCDIC	S	S-SLC	GRAPHIC	EBCDIC	S	S-SLC
1	\	E0		IA		6A		IA
2	1	F1	L	1		4F	U	A821C
3	2	F2	L	2	"	7F	U	821
4	3	F3	L	21C	£	7B	L	B821C
5	4	F4	L	4	\$	5B	U	A
6	5	F5	L	41C	%	6C	U	41C
7	6	F6	L	42C	&	50	L	BAC
8	7	F7	L	421	•	7D	U	42C
9	8	F8	L	8	(	4D	U	81C
10	9	F9	L	81C	)	5D	U	82C
11	0	F0	L	82C	NU	--	--	-----
12	-	60	L	B	=	7E	U	1
13	┌	5F	U	BA821	-	A1		IA
16	q	98	L	B8C	Q	D8	U	B8C
17	w	A6	L	A42	W	E6	U	A42
18	e	85	L	BA41C	E	C5	U	BA41C
19	r	99	L	B81	R	D9	U	B81
20	t	A3	L	A21	T	E3	U	A21
21	y	A8	L	A8C	Y	E8	U	A8C
22	u	A4	L	A4C	U	E4	U	A4C
23	i	89	L	BA81C	I	C9	U	BA81C
24	o	96	L	B42	O	D6	U	B42
25	p	97	L	B421C	P	D7	U	B421C
26	@	7C	L	A	\	79		IA
27	[*#	4A	L	821	{	C0		IA
30	a	81	L	BA1	A	C1	U	BA1
31	s	A2	L	A2C	S	E2	U	A2C
32	d	84	L	BA4	D	C4	U	BA4
33	f	86	L	BA42C	F	C6	U	BA42C
34	g	87	L	BA421	G	C7	U	BA421
35	h	88	L	BA8	H	C8	U	BA8
36	j	91	L	B1C	J	D1	U	B1C
37	k	92	L	B2C	K	D2	U	B2C
38	l	93	L	B21	L	D3	U	B21
39	;	5E	U	21C	+	4E	U	BAC
40	:	7A	U	4	*	5C	U	8
41	] * !	5A	U	B821C	}	D0		IA
44	NU	--	--	-----	_	6D	U	B
45	z	A9	L	A81	Z	E9	U	A81
46	x	A7	L	A421C	X	E7	U	A421C
47	c	83	L	BA21C	C	C3	U	BA21C
48	v	A5	L	A41	V	E5	U	A41
49	b	82	L	BA2	B	C2	U	BA2
50	n	95	L	B41	N	D5	U	B41
51	m	94	L	B4C	M	D4	U	B4C
52	•	6B	L	A821C	<	4C	U	2
53	•	4B	L	BA821	>	6E	U	421
54	/	61	L	A1C	?	6F	U	A1C
56	NU	--	--	-----	NU	--	--	-----

Figure A-40. Code Chart-UNITED KINGDOM

## Appendix B. Terminal Identification and Address

### SDLC Terminal Identification

Each terminal operating under SDLC has a permanent, unique, four-byte identification that it will transmit in response to a request for its ID. This identification is fixed at the time of manufacture and is not selectable.

### Terminal ID

Terminal ID is a special feature that may be specified with the 2741 Start-Stop Line Control feature. It provides a four-character response to a request for its ID. These four characters may be selected by the customer; however, they must be specified at machine order time.

Any of the following characters may be used:

- If the EBCDIC keyboard arrangement is being used, select from:  
A through Z; 0 through 9; #; /; \$; &; @; comma; period; hyphen; C/R; space.
- If the Correspondence keyboard arrangement is being used, select from:  
A through Z; 0 through 9; =; /; apostrophe; hyphen; semi-colon; period; comma; C/R; space.

**Note:** The C/R character may be used only as the last (4th) character of the terminal identification.

If the Alternate Character Set is installed on the terminal, the terminal ID line code bit configuration remains the same for either switch setting.

### Terminal and Group Address

Two characters are used for terminal and group address for the 2740-2 Line Control feature, or the 2740-1 Station Control Line Control feature. The first character must be the terminal address and the second character must be the group address.

Any of the following characters may be used:

- If the EBCDIC keyboard arrangement is being used, select from:  
A through Z; 0 through 9; @; \$; &; hyphen; period.
- If the correspondence keyboard arrangement is being used, select from:  
A, C through W, Y, Z; 0 through 8; =; /; semi-colon; comma; period; apostrophe; hyphen.

If the Alternate Character Set is installed on the terminal, the terminal and group address line code bit configuration remains the same for either switch setting.



## Appendix C. Glossary

IBM is grateful to the American National Standards Institute (ANSI) for permission to reprint definitions from the *American National Standard Vocabulary for Information Processing* (Copyright 1970 by American National Standards Institute, Inc.), which was prepared by Subcommittee X3K5 on Terminology and Glossary of the American National Standards Committee X3. In this glossary, a complete commentary taken from ANSI is identified by an asterisk (\*) that appears between the term and the beginning of the commentary; a single definition taken from ANSI is identified by an asterisk after the item number for that definition.

**addressing:** The means whereby the originator or control station selects the unit to which it is going to send a message.

**alphameric:** Pertaining to a character set that contains letters, digits, and usually other characters such as punctuation marks; synonymous with "alphanumeric".

**APL:** A programming language. A problem solving language designed for use at remote terminals; it offers special capabilities for handling arrays and for performing mathematical functions.

**ASCII:\*** (American National Standard Code for Information Interchange, X3.4-1968) The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, communications systems, and associated equipment. The ASCII set consists of control characters and graphic characters. Synonymous with USASCII.

**BASIC:** An algebra-like language used for problem-solving by engineers, scientists, and others who may not be professional programmers.

**bid:** In the contention form of invitation or selection, an attempt by the computer or a station to seize control of a line so that it can transmit data.

**bps:** Bits per second. In serial transmission, the instantaneous bit speed within one character, as transmitted by a machine or a channel.

**buffer:** (1)\* A routine or storage used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transmitting data from one device to another. (2)\* an isolating circuit used to prevent a driven circuit from influencing the driving circuit. (3) An area of storage that is temporarily reserved for use in performing an input/output operation, into which data is read or from which data is written. Synonymous with I/O area.

**byte:** The representation of a character; eight binary digits (bits), in System/360 or System/370.

**common-carrier:** See "communications common carrier."

**communicate (online):** Pertaining to equipment or devices that are under control of the central processing unit.

**communication line:** Any medium, such as a wire or a telephone circuit, that connects a remote station with a computer.

**communications common carrier:** A government-regulated private company that furnishes the general public with telecommunications service facilities; for example, a telephone or telegraph company.

**CPU:** Central processing unit. The unit of a computer that includes the circuits controlling the interpretation and execution of instructions.

**DAA:** Data access arrangement. A protective interface device provided by the common carrier when non-carrier-provided modems are used on the switched telecommunications network.

**EBCDIC:** Extended binary coded decimal interchange code.

**EIA interface:** A set of signal characteristics (function, voltage, and current) specified by the Electronic Industries Association for business machine/data set connections. Officially defined in "Interface between Data Terminal Equipment and Data Communication Equipment, RS232", and revisions thereto.

**half-duplex:** A communications channel that is capable of transmitting in both directions, but in only one direction at a time.

**integrated communication adapter (ICA):** Performs the same functions as a multiplexer, but it is integrated into the CPU.

**interrupt:** (1)\* To stop a process in such a way that it can be resumed. (2) In data transmission, to take an action at a receiving station that causes the transmitting station to terminate a transmission.

**leased facility:** A facility reserved for sole use of a single leasing user.

**line control:** The scheme of operating procedures and control signals by which a telecommunications system is controlled.

**line speed:** The maximum rate at which signals may be transmitted over a given channel, usually measured in baud or bits per second.

**local (offline):** Pertaining to equipment or devices that are not under control of the central processing unit.

**LRC character:\*** The longitudinal redundancy check character.

**modem:** A device that modulates and demodulates signals transmitted over communications facilities.

**multiplexer:** A device for collecting the input from many communications lines and transferring it to the CPU; also, a device for receiving information from the CPU and transferring it to one of many communications lines without forcing the CPU's timing to match that of the connected terminals.

**multipoint line:** A line or circuit interconnecting several stations. Synonymous with multidrop line.

**offline:\*** Pertaining to equipment or devices not under control of the central processing unit.

## Appendix C. Glossary (continued)

**online:** Associated with a processor, either directly or through a transmission control unit. The physical connection is either by multiwire cable or a communications line.

**overflow:** \* (1) That portion of the result of an operation that exceeds the capacity of the intended unit of storage. (2) A condition caused by entering a number, during offline calculation, that has more integer positions than are allowed by the current decimal point position.

**point-to-point line:** A line that connects a single remote station to the computer; it may be either switched or non-switched.

**private line:** A communications line without interexchange switching arrangements, furnished to a customer for his exclusive use.

**SDLC:** Synchronous data link control. A discipline for the management of synchronous, transparent, serial-by-bit information transfer over a communications channel. SDLC includes comprehensive detection and recovery procedures for transmission errors introduced by the communications channel.

**SNA:** Systems Network Architecture.

**Start-stop transmission:** Asynchronous transmission in which each group of code elements corresponding to a character signal is preceded by a start signal which serves to prepare the receiving mechanism for the reception and registration of a character, and is followed by a stop signal which serves to bring the receiving mechanism to rest in preparation for the reception of the next character.

**switched line:** A telecommunications line in which the connection between the computer and a remote station is established by dialing.

**telecommunications line:** Telephone or other communications lines that are used to transmit messages from one location to another.

**terminal:** A machine or group of machines capable of generating and/or receiving signals transmitted and/or received from a communications line.

**underflow:** A condition caused by entering a number, during offline calculation, that has more fractional positions than are allowed by the current decimal point position.

- acoustic coupler 3-2
- alternate character set 3-3
- APL code chart
  - USA A-12
  - World Trade A-14
- applications 1-4
- ASCII
  - code chart A-13
  - feature 3-5
  - keyboard A-1
- Attention key 4-9
- Austria/Germany
  - code chart A-19
  - keyboard A-3
- Auto switch 4-5
- Auto View switch 4-6
  
- basic SDLC
  - receive 2-3
  - transmit 2-2
- Belgium
  - code chart A-20
  - keyboard A-4
- Brazil
  - code chart A-21
  - keyboard A-4
- Buffer
  - Backspace key 4-11
  - edit 2-3
  - Line Return key 4-11
  - Return key 4-11
  - with Edit 3-2
- buffered SDLC
  - receive 2-3
  - transmit 2-2
  
- calculate functions 3-6
- Calculate-Scientific 3-6
- calculation switch 4-6
- Cancel key 4-8
- character sets
  - available 1-6
  - primary and alternate 3-3
- code charts
  - APL (USA) A-12
  - APL (World Trade) A-14
  - ASCII A-13
  - Austria/Germany A-19
  - Belgium A-20
  - Brazil A-21
  - Correspondence A-15
  - Denmark A-22
  - EBCDIC (Japan) A-17
  - EBCDIC (USA) A-16
  - EBCDIC (World Trade) A-18
  - Finland A-23
  - France A-24
  - Italy A-25
  - Katakana A-26
  - Norway A-27
  - Portugal A-28
  - Spain A-29
  - Spanish-Speaking A-30
  - Sweden A-31
  - United Kingdom A-32
- Code key 4-8
- column indicator 4-5
  
- Communicate/Local switch 4-5
- communicate mode 2-1
- communications facilities 1-7
- correspondence code
  - code chart A-15
  - keyboard A-1
- CPU Select light 4-2
- current pointer 2-3
  
- data access arrangement (DAA) 3-2
- Data Set Ready light 4-4
- Data/Talk switch 4-6
- decimal point position (offline calculation) 3-7
- Denmark
  - code chart A-22
  - keyboard A-5
- Dial Disc switch 4-6
- Double Space/Single Space switch 4-6
  
- EBCDIC (Japan)
  - code chart A-17
  - keyboard A-2
- EBCDIC (USA)
  - code chart A-16
  - keyboard A-2
- EBCDIC (World Trade)
  - code chart A-18
  - keyboard A-3
- edit
  - pointer 2-3
  - switch 4-6
- EIA/CCITT interface 3-2
- End of Block key 4-10
- End of Form light 4-4
- End of Message key 4-10
- entering calculate status 3-6
- EOB key 4-10
- EOM key 4-10
- error conditions (offline calculation) 3-7
  
- features, illustration of 1-2, 1-3
- Finland
  - code chart A-23
  - keyboard A-5
- Form
  - Feed key 4-8
  - Load key 4-9
  - Ready key 4-9
- forms 1-6
- France
  - code chart A-24
  - keyboard A-6
  
- horizontal formatting 2-3
  
- Index key 4-8
- integrated modem 3-2
- integrated modem interrupt 3-2
- interrupt
  - integrated modem 3-2
  - receive 2-2
  - transmit 2-1
- Italy
  - code chart A-25
  - keyboard A-6

- KANA light 4-4
- Katakana
  - code chart A-26
  - keyboard A-7
- keyboard character sets 1-6
- keyboards
  - ASCII A-1
  - Austria/Germany A-3
  - Belgium A-4
  - Brazil A-4
  - Correspondence (USA) A-1
  - Denmark A-5
  - EBCDIC (Japan) A-2
  - EBCDIC (USA) A-2
  - EBCDIC (World Trade) A-3
  - Finland A-5
  - France A-6
  - Italy A-6
  - Katakana A-7
  - Norway A-7
  - Portugal A-8
  - Spain A-8
  - Spanish-Speaking A-9
  - Sweden A-9
  - United Kingdom A-10

- keys
  - Attention 4-9
  - Buffer Backspace 4-11
  - Buffer Line Return 4-11
  - Buffer Return 4-11
  - Cancel 4-8
  - Code 4-8
  - End of Block 4-10
  - End of Message 4-10
  - Form Feed 4-8
  - Form Load 4-9
  - Form Ready 4-9
  - Index 4-8
  - Left Margin Set 4-9
  - Print Buffer 4-10
  - Print Character 4-10
  - Print Line 4-10
  - Print View 4-9
  - Reset 4-10
  - Right Margin Set 4-9
  - System Request 4-8
  - Tab Clear 4-9
  - Tab Set 4-9
  - Vertical Form Set 4-9
  - Vertical Tab 4-8
- keys, illustration of 4-7

- Left Margin Set key 4-9
- lights
  - Column Indicator 4-5
  - CPU Select 4-2
  - Data Set Ready 4-4
  - End of Form 4-3
  - Kana 4-4
  - On Line 4-4
  - Operation Check 4-2
  - Print Inhibit 4-2
  - Proceed 4-4
  - System Check 4-3
  - Test 4-4
  - Upper Case 4-4
  - Weak Signal 4-4
- lights, illustration of 4-1
- line errors 4-3

- Line Speed switch 4-6
- line speeds, illustration of 1-8
- local mode 2-3
- local mode operations 1-7
- machine check 4-3
- magnetic code 3-5
- magnetic stripe
  - card specifications 3-5
  - reader 3-4
- maintenance aids 1-8
- maximum and minimum values (offline calculation) 3-7
- modems 1-8
- modem interfaces 3-2
- modes of operation 2-1
- multiple pressing of the Decimal key (offline calculation) 3-7

- network errors 4-3
- Non-USA considerations 5-1
- Norway
  - code chart A-27
  - keyboard A-7

- offline
  - calculation 3-6
  - operations (see "local mode")
- On/Off switch 4-7
- On Line light 4-4
- operating characteristics 2-1
- Operation Check light 4-2
- operator test 1-9
- overflow (offline calculation) 3-7

- paper roll holder 3-7
- Portugal
  - code chart A-28
  - keyboard A-8
- power
  - supply 5-1
  - switch 4-7
- Primary/Secondary switch 4-6
- Print
  - Buffer key 4-10
  - Character key 4-10
  - Line key 4-10
  - View key 4-9
- Print Inhibit light 4-2
- printer 1-6
- Proceed light 4-4

- receive 2-1
- receive interrupt 2-2
- Reset key 4-10
- Right Margin Set key 4-10

- SDLC 1-1
- SDLC/SS switch 4-6
- security keylock 3-7
- Security Keylock switch 4-7
- sign (offline calculation) 3-7
- SNA terminal address 2-4
- Spain
  - code chart A-29
  - keyboard A-8
- Spanish-Speaking countries
  - code chart A-30
  - keyboard A-9

**special features**

- acoustic coupler 3-2
- alternate character set 3-3
- ASCII 3-5
- buffer with edit (512 bytes) 3-2
- buffer with edit (1024 bytes) 3-2
- Calculate-Scientific 3-6
- data access arrangement 3-2
- EIA/CCITT interface 3-2
- magnetic stripe reader 3-4
- modem interfaces 3-2
- paper roll holder 3-7
- security keylock 3-7
- 1200 bps integrated modem 3-2
- 2740-1 point-to-point line control 3-1
- 2740-1 station control line control 3-1
- 2740-2 line control 3-1
- 2741 line control 3-1
- variable width forms tractor 3-3
- vertical form control 3-3

standby 2-1

start-stop features, illustration of 1-3

states

- receive 2-1
- standby 2-1
- transmit 2-1

Sweden

- code chart A-31
- keyboard A-9

switches

- Auto 4-5
- Auto View 4-6
- Calculation 4-7
- Communicate/Local 4-5
- Data/Talk 4-6
- Dial Disc 4-6
- Double Space/Single Space 4-6
- Edit 4-6
- On/Off (power) 4-7
- Primary/Secondary 4-6
- SDLC/SS 4-6
- Security Keylock 4-7
- Test 4-7

- switches, illustration of 4-5
- System Check light 4-3
- System Request key 4-8

**Tab**

- Clear key 4-9
- Set key 4-9
- terminal identification and addressing 2-4

Test

- light 4-4
- switch 4-6, 1-9

- three-position alphameric (column) indicator 4-5
- total text edit 2-3
- transmission characteristics (magnetic stripe reader) 3-5
- transmission codes 1-6
- transmit 2-1
- transmit interrupt 2-1

underflow (offline calculation) 3-7

**United Kingdom**

- code chart A-32
- keyboard A-10

Upper Case light 4-4

variable width forms tractor 3-3

**Vertical**

- form control 3-3
- Form Set key 4-9
- Tab key 4-8

Weak Signal light 4-4

World Trade considerations 5-1

- 1200 bps integrated modem 3-2
- 2740-1 point-to-point line control 3-1
- 2740-1 station control line control 3-1
- 2740-2 line control 3-1
- 2741 line control 3-1
- 3767 keyboard, illustration of 4-1





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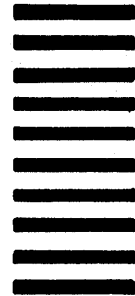
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