

**Systems**

**IBM 3767  
Communication Terminal  
Operator's Guide**

**IBM**

## Preface

This publication describes the basic operating procedures for the IBM 3767 Communication Terminal. The IBM 3767 is a movable, desk-top terminal that is available in three models. The basic difference among the models is the printing rate.

This publication is directed to operators of the IBM 3767 and assumes the operator is familiar with a typewriter keyboard and controls. It also assumes the operator has received training or has read introductory information on the basic operation of a 3767.

Refer to "How to Use this Manual" on the next page for a description of the contents and special features of this publication.

### Related Publications:

*IBM 3767 Models 1, 2, and 3 Communication Terminal Problem Determination Guide, GA18-2012*

*IBM 3767 Models 1, 2, and 3 Communication Terminal Component Description, GA27-3096*

*Operator's Introduction to the IBM 3767 Communication Terminal, GA27-3106*

*IBM 3767 Customer Site Preparation Planning Guide, GA27-3104*

*IBM 3767 Communication Terminal Setup Instructions, GC30-3026*

*IBM 3767 Operator's Trouble Report, GX18-2008*

*Note:* This manual does not contain information about the various RPQs (Request for Price Quotation) available for the 3767. Where applicable, publications for these RPQs are shipped with the 3767. Refer these manuals for further information.

### Fourth Edition (April 1977)

This is a major revision of, and obsoletes, GA18-2000-2 and Technical Newsletters GN18-2027, GN18-2035, and GN18-2055. Extensive changes have been made throughout the manual; therefore, no vertical lines appear in the margins, and the manual should be reread in its entirety.

Information in this manual is subject to changes; any such changes will be reported in subsequent revisions or Technical Newsletters. Before using this publication with the operation of IBM systems or equipment, refer to *IBM System/360 Bibliography, GC20-0360, IBM System/370 Bibliography, GC20-0001*, and associated Technical Newsletters, for the publications that are current.

Requests for copies of IBM publications should be made to your IBM representative or to the IBM branch office serving your locality.

This manual has been written by the IBM System Communications Division, Publication Center, Department E01, P. O. Box 12195, Research Triangle Park, North Carolina 27709. A readers' comment form is provided at the back of this publication. If the form has been removed, comments may be sent to the above address. Comments become the property of IBM.

## TO THE READER:

### How to Use This Manual

The step-by-step operating instructions given in this manual include all the different arrangements and features that an IBM 3767 Communication Terminal may have. You need to identify the instructions that pertain to your individual machine. (Most of the others can be removed from the manual and stored at the back of the IBM 3767 Operating Information binder to simplify your use of the manual.) Follow the seven steps listed here, to familiarize yourself with your machine and with the manual:

1. Turn to the last page of the manual preceding the index and unfold the terminal panel diagram that you will find there. This diagram, Appendix E Terminal Panel Diagram, shows all the switches, indicator lights, and control keys that may be on the 3767. (These keys, lights, and switches are described in Appendix A.)
2. Look at the diagram and at your 3767; in the list below, check the features and accessories that are present on your machine:

\_\_\_\_\_ Calculation. This feature is present if switch 12 (Calc-Off) is on your 3767. If the feature is not present, you can remove Appendix B and Appendix C from the manual; you will not need them because they describe the operation of the Calculation feature.

\_\_\_\_\_ Start/Stop. Your 3767 may have one of the four Start/Stop (S/S) features; if it does, it has switch 9 (SDLC-S/S) installed. Your supervisor can tell you which of these S/S features you have (this information can also be found on the equipment list shipped with the 3767): 2741, 2740-1 Point-to-Point, 2740-1 Station Control, or 2740-2. You can remove the operating instructions for the S/S features that you do *not* have from Chapter 4. If you do not have any S/S features, you may remove all four sets of S/S operating instructions.

\_\_\_\_\_ Buffer With Edit. This feature allows you to make corrections on the information that you have stored in the 3767, before you transmit or print it. The feature is present if your 3767 has switch 3 (Edit-Off) installed. (This feature also includes control keys 25, 26, 27, and 31.) If your machine does not have switch 3, you can disregard the information on "Buffered SDLC and 2740-2" under "Buffer Edit Operation" in Chapter 4.

\_\_\_\_\_ Vertical Forms Control. This feature is present if your 3767 has control keys 1 (Form Feed) and

2 (Vert Tab). (With this feature, "Vert Form Set" is engraved above the "6" key.) If this feature is not present, you can disregard the information on "Vertical Forms Control (VFC)" in Chapter 3. \_\_\_\_\_ Alternate Character Set. This feature is present if your 3767 has switch 10. If the feature is present, you also have a decal card with the nomenclature for the secondary character set. You can use this card as-is for reference, or you can stick the individual decals to the front surface of the individual keys. Your application procedures direct when to use the secondary character set (press the lower part of switch 10).

*Note:* If your 3767 also has the Calculation feature, select one set of decals to use as a reference card. The other set can be attached to the keys.

\_\_\_\_\_ Forms Tractor. This device attaches to the top of the 3767 and allows the machine to feed paper with holes punched along the left and right edges. If your machine has this device, refer to "Attaching the Variable Width Forms Tractor" in Chapter 3 for instructions on putting paper into the machine, putting the Forms Tractor on the machine, or taking it off.

\_\_\_\_\_ Paper Roll Holder and Forms Guide. This device hangs on the back of the 3767 and allows the machine to feed paper from a roll. If it is present, refer to "Attaching the Paper Roll Holder and Forms Guide" in Chapter 3 for instructions on putting paper into the machine.

\_\_\_\_\_ Security Keylock. If this feature is installed, you will find a small circular key-receptacle on the right side of the 3767. You must insert and turn the key before you turn the On-Off switch to "On".

3. Refer to Chapter 2 to learn how to get the 3767 ready to operate. Chapter 2 also describes how the machine acts when you turn the On-Off switch to "On" (this is called power-on) and when you turn it to "Off" (this is called power-off).
4. Refer to Chapter 3 for instructions on operating the printer: replacing the ribbon; inserting paper; setting the print head horizontally (for paper forms that require accurately placed printing); setting margins and tabs; and setting vertical line positions for Vertical Forms Control (VFC). You can practice these in Local Mode (using the 3767 as an off-line keyboard-printer) so that you will be familiar with them when you are using the 3767 in Communicate Mode. If your machine has the Buffer with Edit feature, you may also want to practice that operation in Local Mode. Chapter 5 describes Local Mode operation.

1

2

3

4

Edit

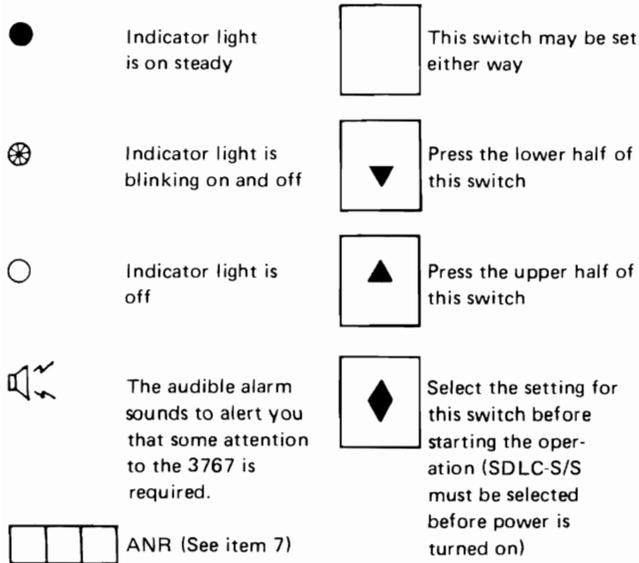
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6

B

5. Your supervisor will instruct you in the operation of the 3767 for your company's application. In addition, Chapter 4 contains instructions for operating the 3767 "on-line" (in Communicate Mode). To prepare yourself for this, review "Establishing a Connection", "Initiating Communicate Operations", and "Terminating Communicate Operations" in Chapter 4. Select the appropriate operations for your terminal, as instructed there.
6. There are diagrams of the 3767 switches and indicator lights at various places in this manual. (On these diagrams, ignore switches that are not on your machine.) The legends below show how to read these diagrams:

7. The ANR (Alphanumeric Readout) indicators (13 in the diagram) normally show a number from 1 to 133. This is the number of the next printing position where a character will be printed. When the System Check indicator (4 in the diagram) is on and the ANR has a number higher than 133 the 3767 has detected an error. If this happens, or if the Oprn Check light (3 in the diagram) is on, or any other problems occur, see *IBM 3767 Models 1, 2, and 3 Communication Terminal Problem Determination Guide*.



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Intro

Power On/Off

Printer

Comm Mode

Edit

Local Mode

PDT

Calc



IBM 3767 Communication Terminal

The IBM 3767 Communication Terminal is a movable, desktop terminal that is available in three models. The basic difference among the models is the printing rate.

The 3767 can provide two-way data communication with a host CPU (Central Processing Unit) or can be used as a keyboard-printer.

### TERMINAL VARIATIONS

Read "How to Use This Manual" at the front of this manual for information on how machine configuration affects operation of the machine and use of this manual.

### PRINTER

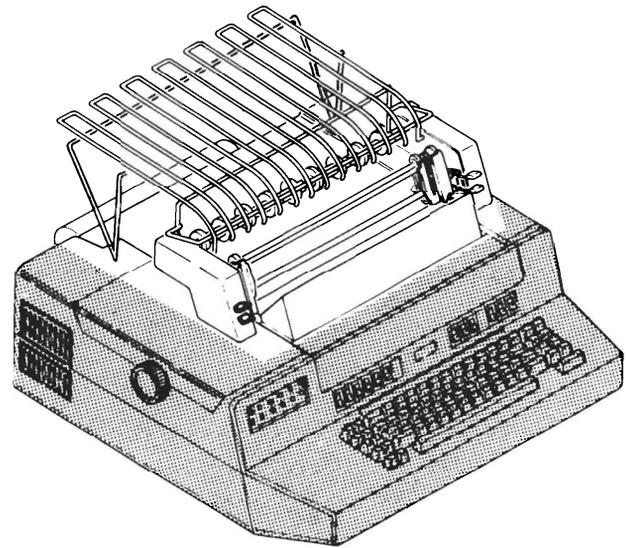
The 3767 Communication Terminal has a fast, versatile printer which can print either forward (left to right) or reverse (right to left). Characteristics of the 3767 printer are as follows:

- Character spacing: 10 per inch (2.54 mm each)
- Print positions: 132 (13.2 inches; 33.53 cm)
- Line spacing: 6 per inch (4.233 mm each)
- Character set: 96/128 (The 128-character Katakana set is available for Japan.)

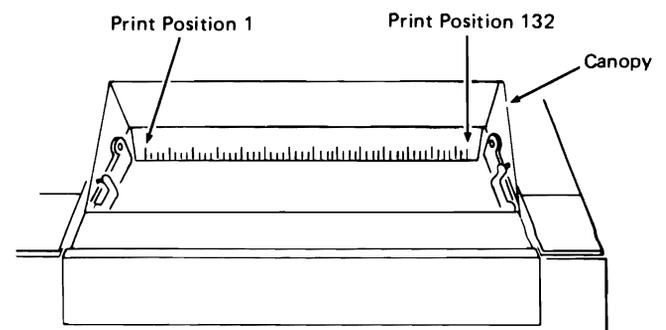
There are two ways of determining the print position on the 3767. The first, a three-position, alphanumeric readout (ANR), normally displays the next print position regardless of the physical position of the print head. This position can be located on the scale on the back edge of the transparent canopy that covers the print head.

The second method of locating the next print position uses the Auto View switch or the PRINT VIEW key (Print view will not function beyond print position 124). When the Auto View/Off switch is in the Auto View position, the print head automatically moves several positions to the right after printing each keyed-in character; the vertical line on the transparent guide attached to the print head is centered over the next print position.

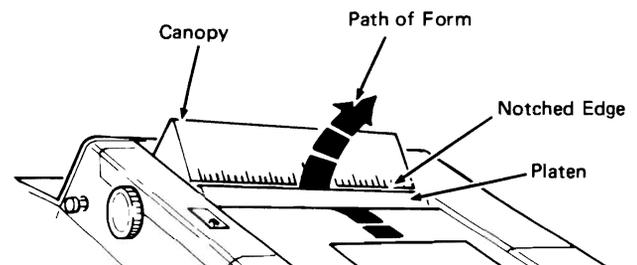
If the form release lever is set for tractor-fed continuous forms (to the front of the terminal), the End Form light comes on and the print head automatically moves to the leftmost position when the form advances to a point ten lines before the end of the form. While this light is on, no printing can take place.



A print position scale (column indicator) is engraved on the rear surface of the canopy.



The rear notched edge of the canopy can be used to tear off the continuous form.



(View from the Back of the Terminal)

## KEYBOARD

Four keyboard character sets are available:

### EBCDIC

Correspondence (USA only)

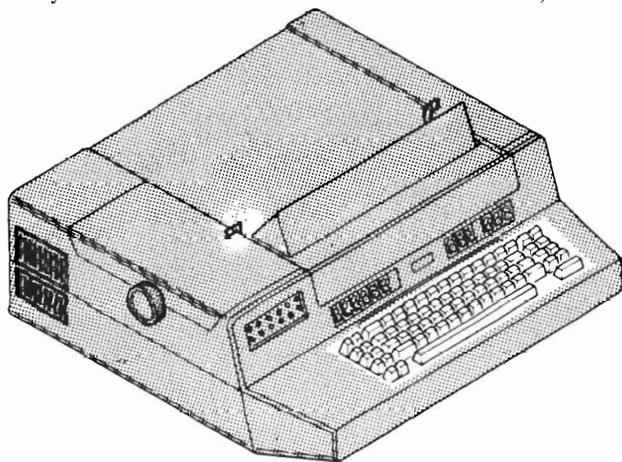
Katakana (Japan only)

### ASCII

*Note:* APL, Mono I, or Mono II is also available as an alternate keyboard character set.

When Mono I is used, only uppercase alphabetic characters are printed when data is entered from the keyboard, regardless of the keyboard shift. Likewise, only uppercase alphabetic characters are transmitted on the communications line from the 3767. When data is received from the host, however, both uppercase and lowercase alphabetic characters are printed.

When Mono II is used, only uppercase alphabetic characters are printed when data is entered from the keyboard or when data is received from the host, re-



gardless of the keyboard shift. However, uppercase and lowercase alphabetic characters are transmitted on the communications line when they are entered on the 3767 keyboard according to the keyboard shift.

The character set is on the key tops. If your terminal has the alternate character set feature, the keyboard can be used in two ways, as primary character set keyboard or as secondary character set keyboard, depending on the setting of the

keyboard character set selection switch. The primary character set is on the key tops; and you will have a card with decals of the key nomenclature for the secondary character set.

When you shift the keyboard to upper case, the Upper Case light comes on and stays on until you shift the keyboard back to lower case.

The function of a data key may vary with the pressing of the Shift, Lock, or CODE key or with the setting of the Alternate Character Set or Calc/Off switch.

*Note:* Katakana keyboard (Japan only) functions are also altered by the Alphanumeric, Alpha Symbol, Katakana, or Katakana Symbol shift keys.

英数      Alphanumeric Shift

英記号      Alpha Symbol Shift

カナ      Katakana Shift

カナ記号      Katakana Symbol Shift

Functional symbols and their translations are shown below:

←      Backspace

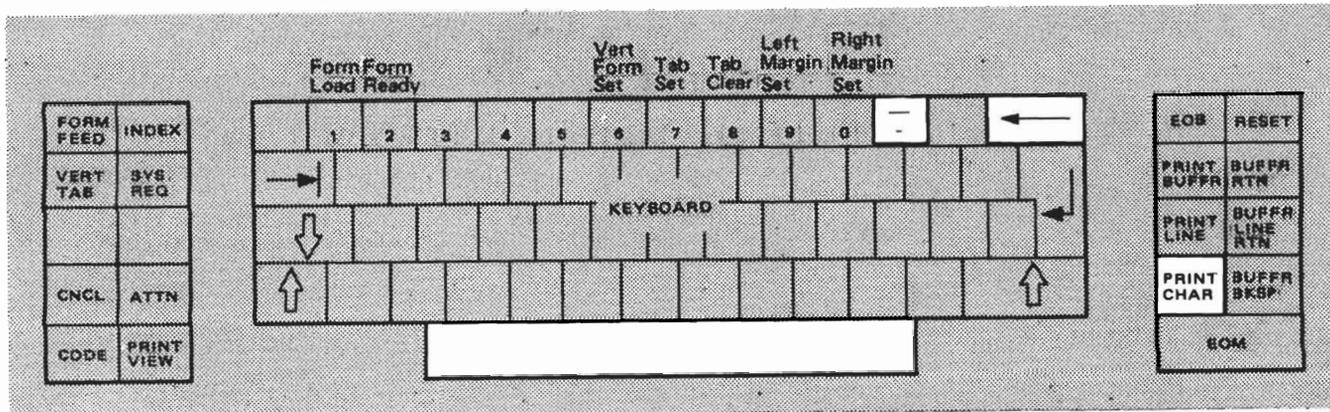
↵      Return

⇧      Shift

⇩      Shift Lock

→      Tab

Four keyboard keys are typamatic keys (keys that repeat their functions when pressed and held): Space, Hyphen/Underscore, Backspace, and PRINT CHAR (the unshaded keys shown in the keyboard diagram below). The hyphen and underscore key may be in a different position for various countries. On United Kingdom keyboards, hyphen and underscore are on separate



keys and neither is typamatic. On Katakana keyboards, Tab and Return are typamatic keys; hyphen and underscore are not.

Some of the keys (called "inactive" keys in Start/Stop line control) are active only when the terminal is operating under SDLC line control. If these keys are pressed in Start/Stop line control (2740 Model 1, 2740 Model 2, or 2741 line control operation), the function of the key is ignored and the Oprn Check light is turned on. These keys vary according to the keyboard used in various countries, as follows:

<u>Keyboard for</u>	<u>Inactive Keys (Start/Stop)</u>					
Austria/Germany	β	Ä	ä	Ü	ü	
Belgium	¨	`	ù	é	è	ç
Brazil	\	~	"	\$	É	é
Denmark	\	`	ü	"	#	⊠
Finland	É	ü	"	§	⊠	é
France	¨	`	ç	è	é	ù
Italy	é	è	ì	ò	à	ù
Norway	\	`	ü	#	"	⊠
Portugal	`	´	ç	ã	õ	[blank*]
Spain	{	}	¨	`	"	\
Spanish Speaking	{	}	¨	`	"	\
Sweden	É	ü	"	§	⊠	é
United Kingdom	{	}	`	\	-	
International	~	\		{	}	`
Japan—Non-Kana	-	\$		`	{	}

\* lower case of >

Some of the keys (called "dual graphic" keys) print different graphics depending on the line control (SDLC or Start/Stop) being used when the key is pressed. The nomenclature on the keytop shows only the graphic for SDLC. These keys vary according to the keyboard used in various countries, as follows:

<u>Keyboard for</u>	<u>Line Control</u>	<u>Dual Graphic Keys</u>	
Brazil	SDLC S/S	!	^
France	SDLC S/S	à	£ ° § ! ^
International	SDLC S/S	[ ]	^
Italy	SDLC S/S	°	£ ç § ^
Portugal	SDLC S/S	[ ]	^
Spain	SDLC S/S	[ ]	!
Spanish Speaking	SDLC S/S	[ ]	!
United Kingdom	SDLC S/S	[ ]	# !

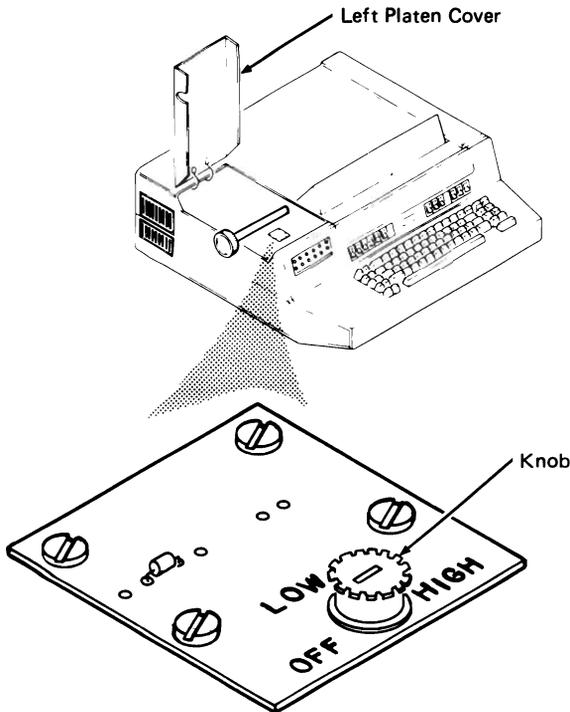
Some of the graphics used by the 2741 Communication Terminal are replaced with different graphics on the 3767, as follows:

<u>Keyboard for</u>	<u>2741 Graphics</u>	<u>3767 Graphics</u>
Austria/Germany	ç   @	⊠ § ⊠
Belgium	! ç   ┘ @	] ] [ ] ! ^ à

## AUDIBLE ALARM

An audible alarm is a standard feature of the terminal. This alarm sounds for various intervals when certain conditions (for example, the right margin of a printing line) may require operator attention.

An operator can change the volume of the sound. You will find the control knob if you open the left platen cover.

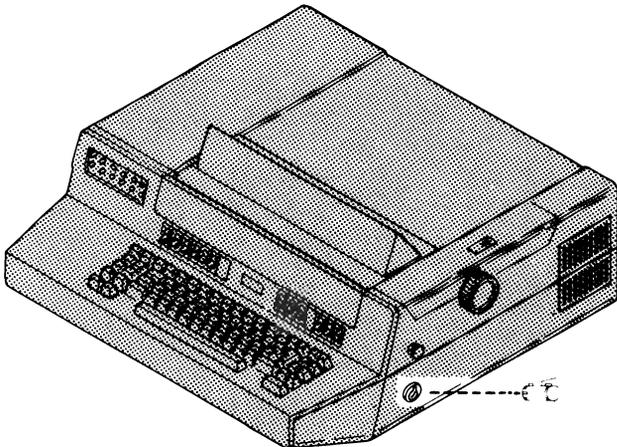


Turn the knob clockwise to increase the volume of the sound; turn the knob counterclockwise to reduce it.

*Caution:* Do not force the knob beyond stops.

## SECURITY KEYLOCK

The Security Keylock is a key-operated switch that prevents unauthorized use of the terminal.



The keylock must be unlocked before you turn the On/Off switch to On. Turn the On/Off switch to Off before locking the keylock.

There will be no damage to the machine if the On/Off sequences are reversed; but a 5- to 10-second wait, with both switches off, will be required before you can successfully turn the machine on.

## BUFFER

The buffer is an area for temporarily storing keyed-in data until it is transmitted, or received data until it is printed. Correction or editing of data before transmission is done in the buffer.

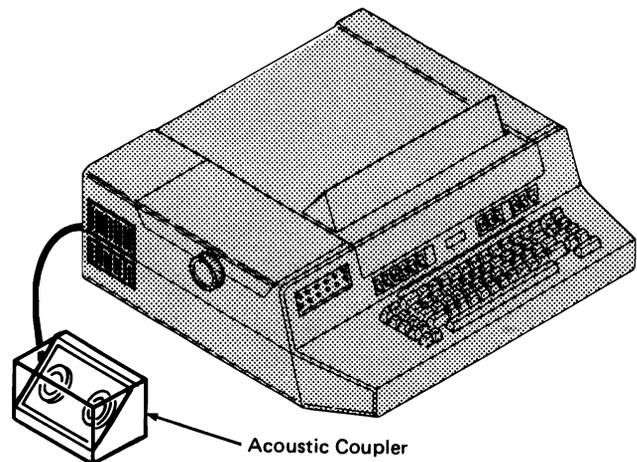
## MODEM

A modem is required for a 3767 terminal to communicate with a host.

There are two types of modems. An integrated modem operates as part of the terminal. An external modem is a separate unit and requires operator attention such as turning power on and off.

## ACOUSTIC COUPLER

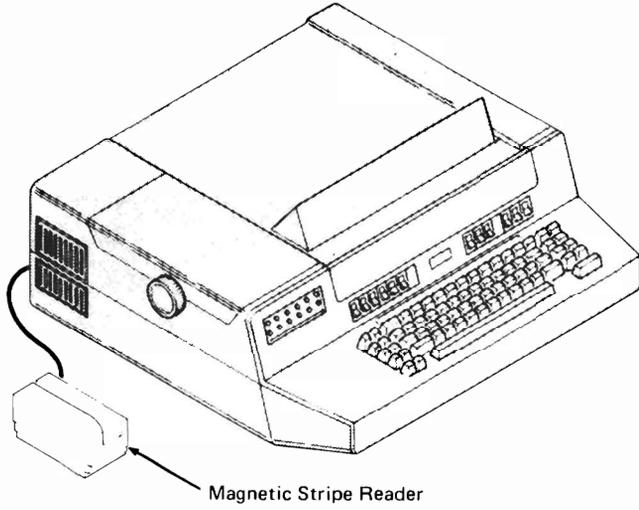
The acoustic coupler connects the terminal to an ordinary telephone set for communicating with the host. The acoustic coupler is connected to the terminal by a cable.



If you have a 3767 with an acoustic coupler, the Normal Signal light replaces the Data Set Ready light on the panel shown in Appendix E.

In acoustic coupler operation, Normal Signal light on while in receive mode (the Proceed light is off) indicates that the receive signal level is high enough to operate, and communication should be entirely satisfactory.

## MAGNETIC STRIPE READER



The magnetic stripe reader reads data recorded on a magnetic stripe card when the terminal is operating under SDLC line control.



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**IMPORTANT POINTS TO REMEMBER**

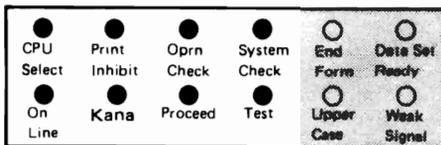
1. Keep covers closed except when changing the ribbon or loading paper into the printer.
2. Always turn power off to replace the ribbon or remove the platen.
3. Do not drop anything into the machine; keep fingers, hair, etc., out of the printer area.
4. Do not spill any liquids into the machine.
5. Be sure the grillwork at the left rear and right rear is not obstructed.
6. Do not allow the printer to print at or beyond the perforations (for pin-feed forms), on the edge of the forms on either side, or across any prepunched holes or serrations. Such printing could damage the print wires in the print head.
7. When using the keys in the numeric row for their alternate functions (see "Chapter 3. Forms Control"), you must first press and hold the CODE key.
8. If the machine does not operate correctly, refer to "Chapter 6. Problem Determination Procedures" for instructions.

**SUPPLYING POWER TO THE TERMINAL**

**Power On**

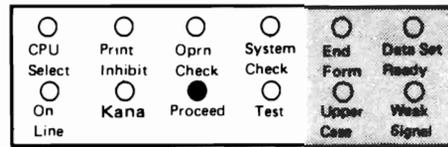
To supply power to your terminal:

1. Make sure the On/Off switch is Off.
2. Plug in the power plug.
3. Set the SDLC-S/S switch to the proper position.
4. Set the Comm/Local switch to Local.
5. Set the Calc/Off switch to Off.
6. If you have an external modem, turn the modem power on.
7. Insert the key and unlock the security keylock (turn the key clockwise), if present.
8. Turn the On/Off switch On and watch the indicator lights.
  - a. ANR displays **1 8 8** and the left-hand eight lights on the indicator panel turn on for about two seconds.



*Note:* Ignore the lights in the shaded area.

- b. Some of the lights blink on and off after that.
- c. The print head moves to the left.
- d. ANR displays **1 1 1** and the Proceed light is on. The 3767 is ready for operation. (The total time is about 12 seconds.)



*Note:* Ignore the status of the lights in the shaded area.

If this test does not end with the conditions in 8c and 8d, refer immediately to "Chapter 6. Problem Determination Procedures."

*Note:* If all eight lights at the left side of the indicator panel do not come on briefly at the beginning of the power-on test, write down which ones do not come on on a Trouble Report form. (See "Trouble Report" in Chapter 6.)

After every power on, the terminal is set as follows:

- Left Margin: Print position 1
- Right Margin: Print position 132
- Maximum Print Position: Print position 132 (SDLC)  
(All horizontal tabs and VFC settings are cleared.)

**Power Off**

When you want to turn off the power supply to your terminal:

1. Press and hold the CODE key, then press and release the Form Load key (to move the print head to the extreme left position).
2. Turn the On/Off switch Off.
3. Lock the security keylock (turn the key counterclockwise), if present.

*Caution:* If you notice smoke, excessive heat, or unusual noises, or if the print head sticks at the righthand position:

1. Turn the On/Off switch Off.
2. Lock the security keylock.
3. Unplug the power plug.
4. Remove paper from the printer.
5. Fill out a Trouble Report form and call the 3767 service representative. (See Chapter 6.)

**OPERATING MODES**

The 3767 has four operating modes.

- a. Communicate mode  
In communicate mode, the terminal can send or receive data to or from the host unit through a communication line. Chapter 4 describes how to operate the terminal in communicate mode.

Power On/Off

- b. Local mode  
In local mode, the terminal is used as a keyboard printer. Chapter 5 describes how to operate the terminal in local mode.
- c. Calculate mode (if calculation feature is installed.)  
In calculate mode, the terminal is used as an electronic calculator to perform mathematical or scientific calculations. Appendixes B and C describe the operation of the 3767 in calculate mode.
- d. Test mode  
In test mode, the terminal performs a built-in test that checks the basic function of the machine. Chapter 6 describes how to operate the terminal in test mode.

**MODE TRANSITIONS**

The operating mode depends on the settings of the Comm/Local, Calc/Off, and Test/Off switches. Change modes as follows:

- 1. From communicate mode to local mode:  
Turn the Comm/Local switch to Local.
- 2. From communicate mode to calculate mode:  
First, turn the Comm/Local switch to Local.  
Then, turn the Calc/Off switch to Calc.
- 3. From Local mode to Communicate mode:  
Turn the Comm/Local switch to Comm.
- 4. From Local mode to Calculate mode:  
Turn the Calc/Off switch to Calc.
- 5. From Calculate mode to Local mode:  
Turn the Calc/Off switch to Off.

- 6. From Calculate mode to Communicate mode:  
First, turn the Calc/Off switch to Off.  
Then, turn the Comm/Local switch to Comm.
- 7. From Communicate, Local, or Calculate mode to Test mode:  
Press and release the Test/Off switch.

*Caution:* Because pressing the Test switch during any operation can cause data loss or unpredictable operation, always complete the current operation before entering test mode.

When the test ends, the terminal automatically returns to the mode selected by the Comm/Local and Calc/Off switches.

Terminal operations possible in each operating mode are:

<i>Operations</i>	<i>Comm Mode</i>	<i>Local Mode</i>	<i>Calc Mode</i>	<i>Test Mode</i>
Transmit	X			
Receive	X			
Buffer edit	X	X		
Set margins	X	X		
Set horizontal tabs	X	X		
Vertical form control	X	X		
Magnetic stripe reader	X	X		
Keyboard to printer		X		
Calculation			X	
Test	X	X	X	X

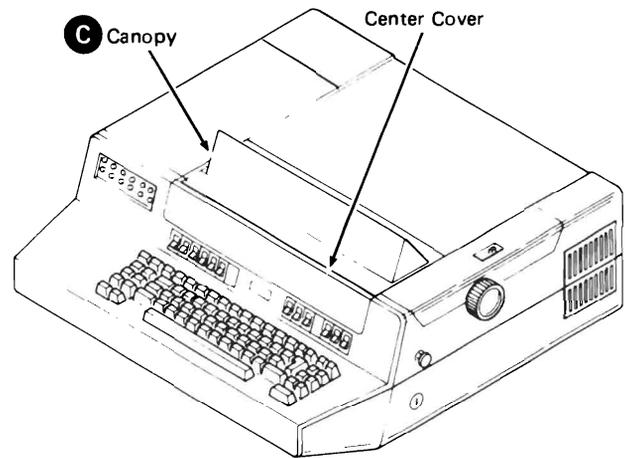
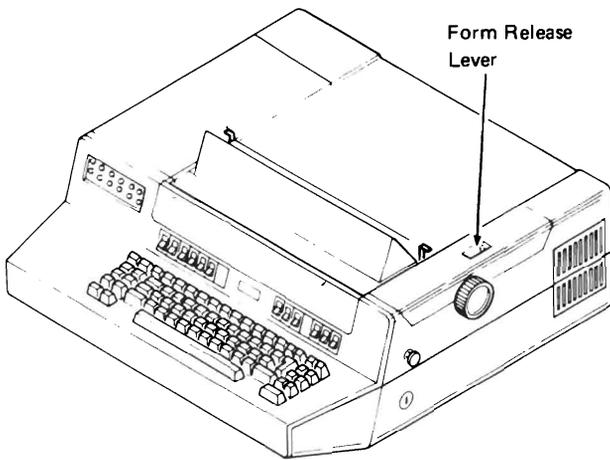
*Note:* The instructions given in this manual describe typical procedures that can be used to operate the 3767 terminal. Your supervisor may instruct you to perform additional procedures required for your application.

**FORM RELEASE LEVER**

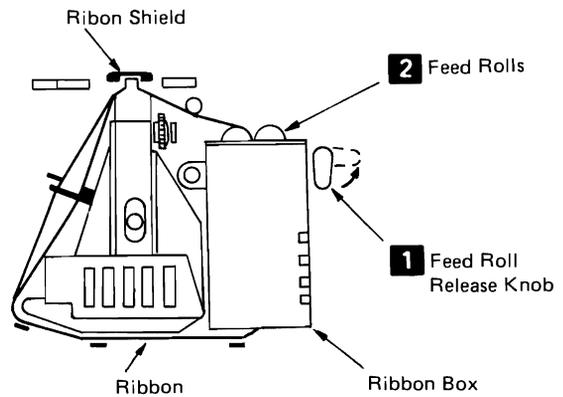
When the Form Release lever is positioned to the rear, the paper is gripped against the platen by the rollers under the platen and feeds by friction as the platen turns. The end-of-forms detector is retracted and not active.

When the forms tractor is used, the form release lever should be in the front position, which releases the friction feed by the rollers under the platen and activates the end-of-forms detector. The movement of the form is controlled by the forms tractor pin feed.

When the paper bail rollers are used, the form release lever should also be in the front position. The movement of the form is friction fed by the paper bail rollers, not by the rollers under the platen. The End Form light turns on ten lines before the end of the last form. When the End Form light is on, the print head is at the extreme left position and no further printing can take place.



4. Manually move the print head toward the center of the platen.
5. Rotate the feed roll release knob **1** counterclockwise one-quarter turn to open the feed roll **2** and release the ribbon.



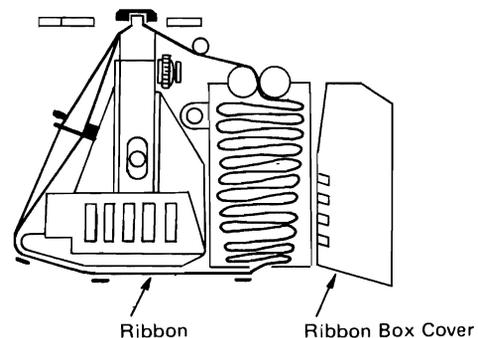
6. Put on the gloves supplied with the new ribbon.
7. Open the ribbon box cover.

*Caution:* Never try to open the cover beyond its stop.

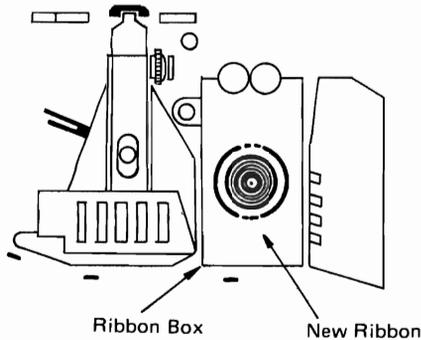
**REPLACING THE RIBBON**

A brief description of the ribbon changing procedure is shown inside the ribbon box cover for quick reference. If you need more detailed instructions, follow this procedure:

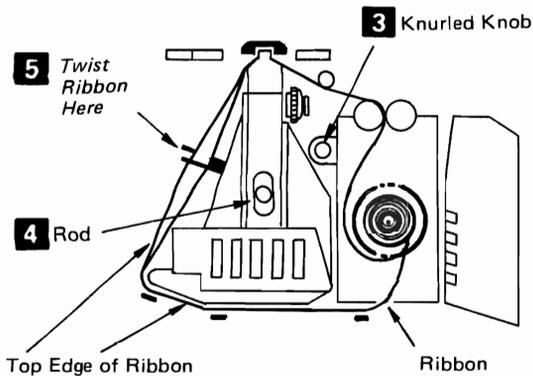
1. Turn the On-Off switch to Off.
2. Remove the forms tractor, if your machine has one.
3. Swing the canopy **C** forward; holding the canopy firmly in this position, swing the center cover and canopy together up and toward the rear.



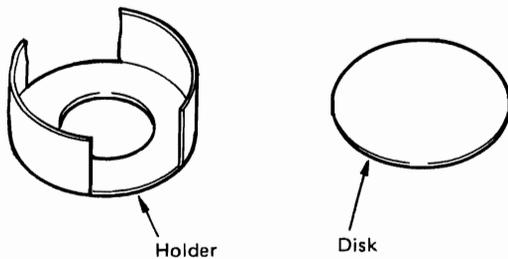
8. Remove the old ribbon and discard it.
9. Place the new ribbon and its holder into the ribbon box by pressing on the holder.



10. Pull additional ribbon to allow threading the loose loop of the new ribbon as shown. Twist at position **5**. (Retract the print head by pulling the rod **4** toward the front for easier threading between the print head and the platen.)

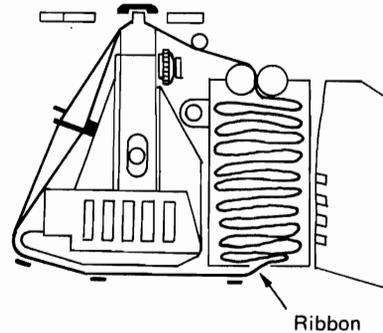


11. Remove the holder (and disk, if present) from the ribbon and discard it.



12. Close the ribbon box cover, and rotate the ribbon feed roll release knob **1** clockwise to the original position.
13. Rotate the knurled knob **3** clockwise to remove slack from the ribbon. Continue turning the knob only until you are sure that the ribbon is running properly around the print head.

14. Watching that the ribbon is feeding properly, manually move the print head back and forth until the new ribbon is unwound. This operation is complete when the ribbon is laced back and forth in the ribbon box as shown. Occasionally open the ribbon box cover and check to see that the ribbon is laced back and forth.



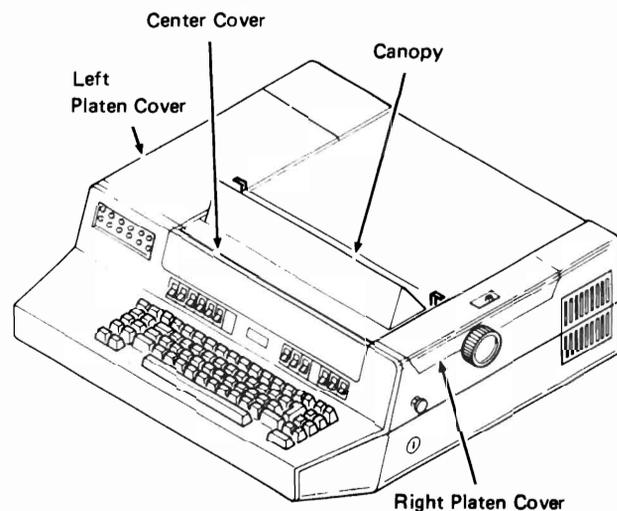
(Gloves are not needed after this step.)

15. Manually move the print head to the extreme left position.
16. Hold the canopy firmly up against the center cover. Swing the center cover and canopy together up and toward the front. Then swing the canopy back to the original position.

*Caution:* The canopy must be held up against the center cover before swinging the cover and canopy toward the front. Otherwise the canopy or print head may be damaged.

## PLATEN Removal

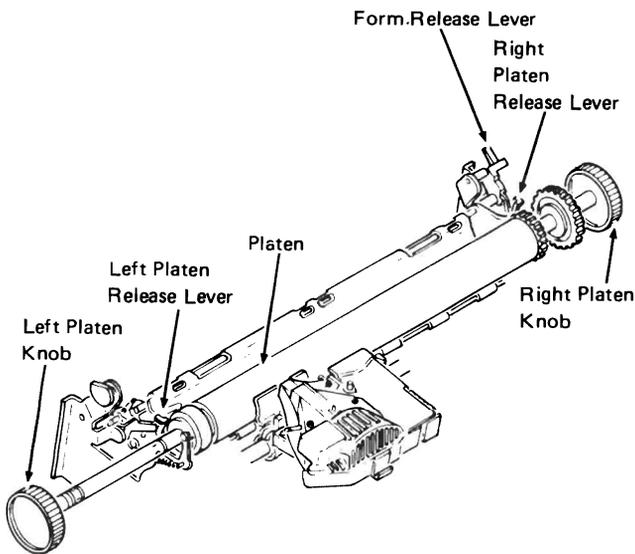
1. Turn the On/Off switch to Off.
2. Remove paper from the printer, if inserted.
3. Remove the forms tractor or paper bail assembly, if attached.
4. Open the left and right platen covers.



5. Swing the canopy forward; holding the canopy firmly in this position, swing the center cover and canopy together up and toward the rear.
6. Manually move the print head toward the center of the platen.
7. Hold the canopy firmly up against the center cover. Swing the center cover and canopy together up and toward the front.

*Caution:* The canopy must be held up against the center cover before swinging the cover and canopy toward the front. Otherwise the canopy or print head may be damaged.

8. Pull the form release lever forward.
9. Press and hold the left and right platen release levers with your thumbs and lift the platen up out of the machine.



10. Close the left and right platen covers, and swing the canopy back to its original position.

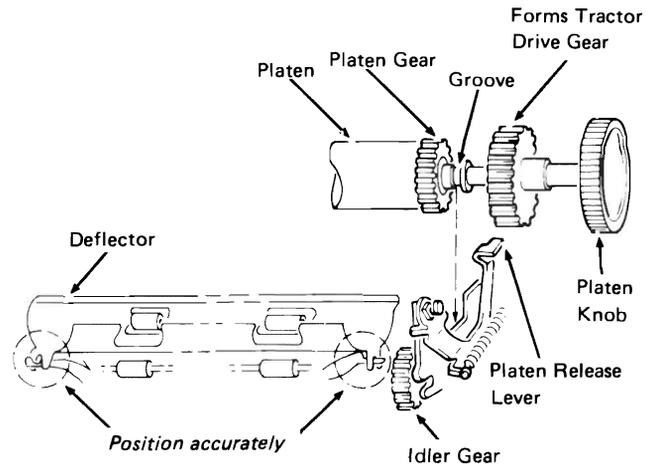
### Installation

1. Check to see that the On/Off switch is Off.
2. Open the left and right platen covers.
3. Swing the canopy forward.
4. If the print head is not located near the center of the platen, move it to that position as follows:
  - a. Holding the canopy firmly against the center cover, swing the center cover and canopy together up and toward the rear.
  - b. Manually move the print head toward the center of the platen.

- c. Hold the canopy firmly up against the center cover. Swing the center cover and canopy together up and toward the front.

*Caution:* The canopy must be held up against the center cover before swinging the cover and canopy toward the front. Otherwise the canopy or print head may be damaged.

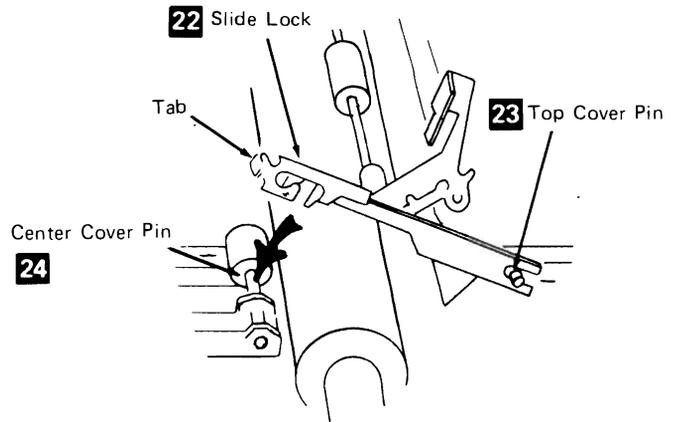
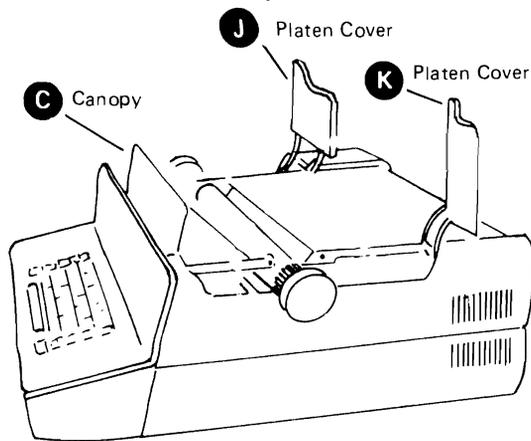
5. If the form release lever is in the rear position, pull it forward.
6. Check to see that the deflector is correctly positioned (engaged and seated on both ends).



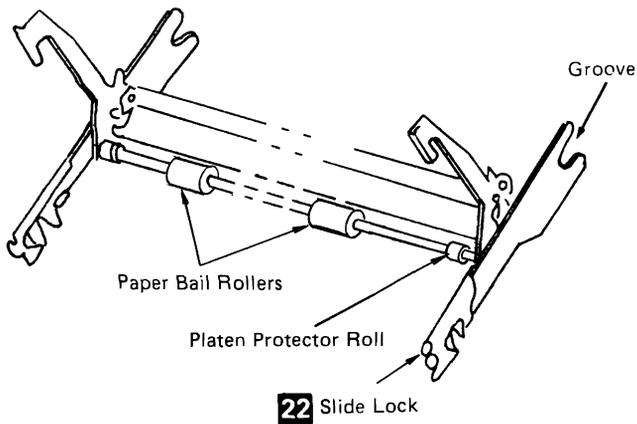
7. Hold the platen with the gear to the right.
8. Place the groove of the platen bearing in the right platen latch and align the gears horizontally.
9. Press down on both ends of the rubber platen. The platen will snap into place if you have aligned it correctly. Rotate the platen by one of the platen knobs to be sure the gears mesh properly and turn when the platen turns.
10. Swing the canopy back to its original position.
11. Close the platen covers and move the form release lever to the rear.

## ATTACHING THE PAPER BAIL ASSEMBLY

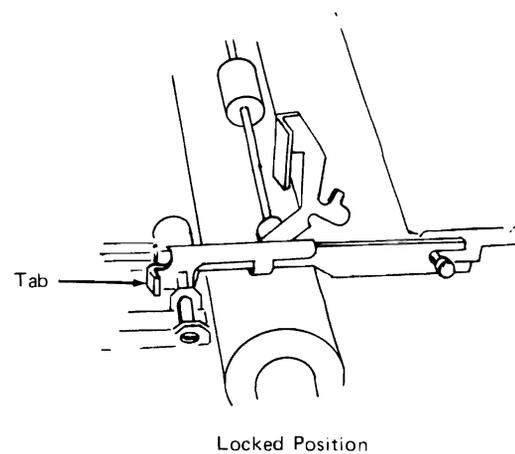
1. Open the platen covers **J** **K**.



2. Swing the canopy **C** up and forward.
3. Hold the bail assembly as shown below so that the slide-locks **22** are toward you.



*Note:* The Platen Protector Roll should be positioned at the extreme right. It should not lie on the paper.



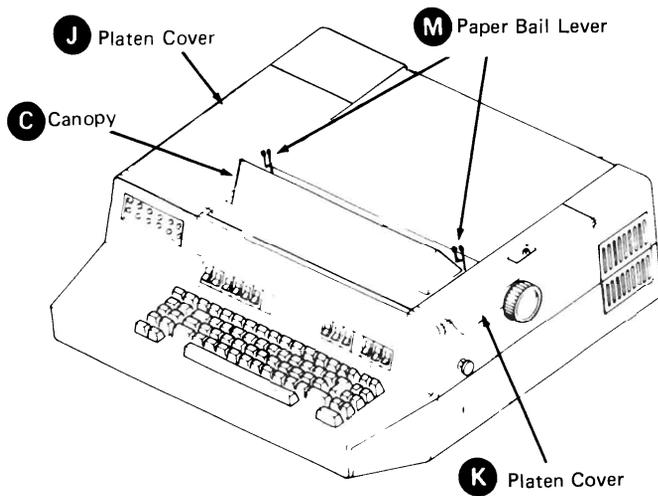
5. Lower the platen covers.
6. Swing the canopy **C** up and backward to its original position.

When the paper bail rollers are used to feed the form, the form release lever should be in the front position.

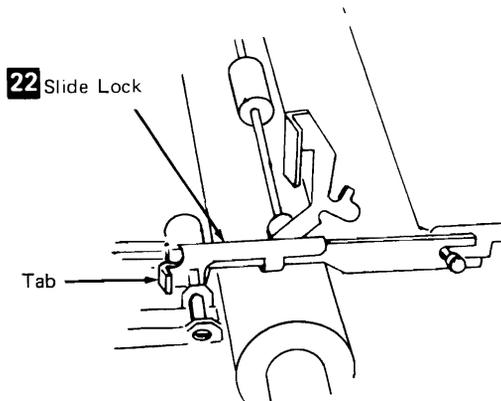
4. Place the grooves of the bail over the top-cover pins **23**. Lower the slide-lock ends until they rest on the center cover pins **24** (requires a slight downward pressure). Extend the bail slide locks **22** toward you, then push the tabbed ends of the slide locks toward the back of the terminal as far as they will go to lock the bail assembly.

## REMOVING THE PAPER BAIL ASSEMBLY

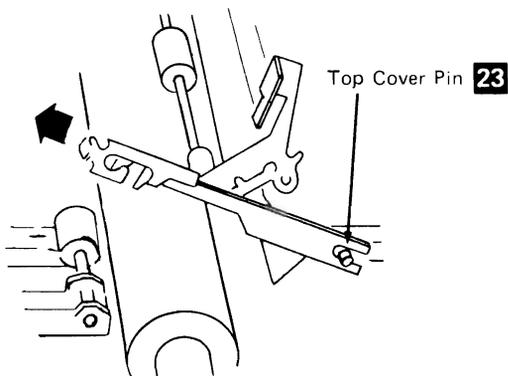
1. Move the paper bail lever **M** forward to lower the paper bail rollers.



2. Open the platen covers **J** **K**.
3. Swing the canopy **C** up and forward.
4. Applying a slight downward pressure on the left and right slide locks **22**, pull the slide-lock tabs toward the front of the terminal as far as they will go.



5. Raise the slide-lock ends of the paper bail upward, and pull off the paper bail from the top cover pins **23**.



6. Close the platen covers.
7. Swing the canopy **C** up and backward to its original position.

Store the paper bail assembly in a safe place. Be sure the paper bail rollers are in the lowered position.

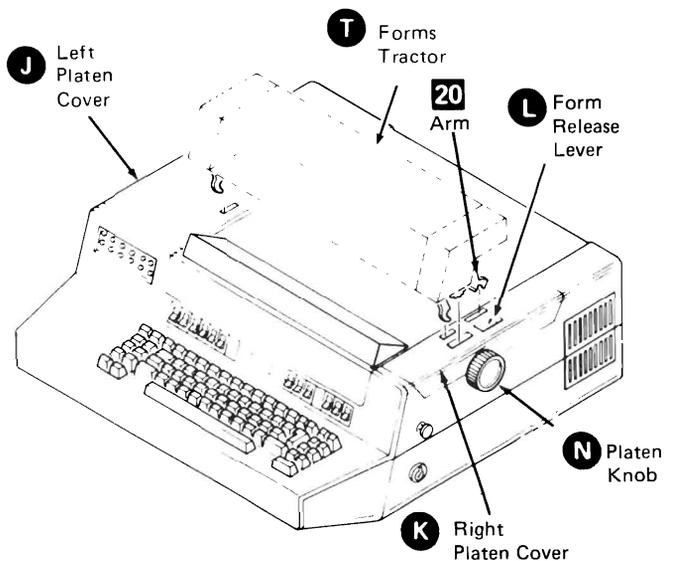
## ATTACHING THE VARIABLE WIDTH FORMS TRACTOR

The variable width forms tractor is used for efficient continuous forms feeding and registration. To attach the forms tractor:

1. Remove the paper bail assembly, if installed. Store it in a safe place.
2. Hold the forms tractor **T** so that the gear of the unit is to the right.
 

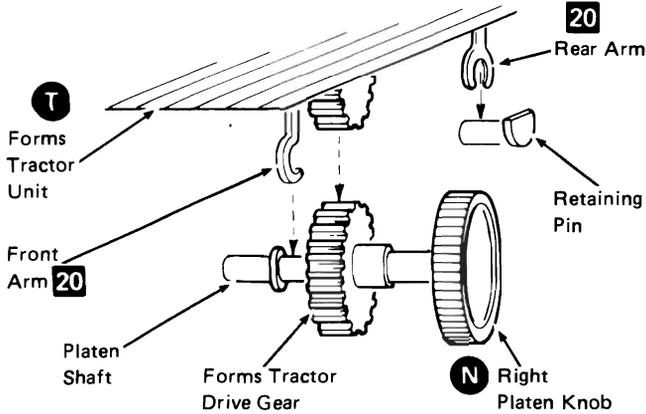
*Note:* The tractor assembly must be fully seated at all four mounting points, as described in the next two steps. An improperly seated tractor may cause forms skew.
3. Place the supporting arms **20** of the forms tractor over the slots in the platen covers.

*Caution:* Keep your fingers out from under the forms tractor. There is a danger of pinching them in the next step.

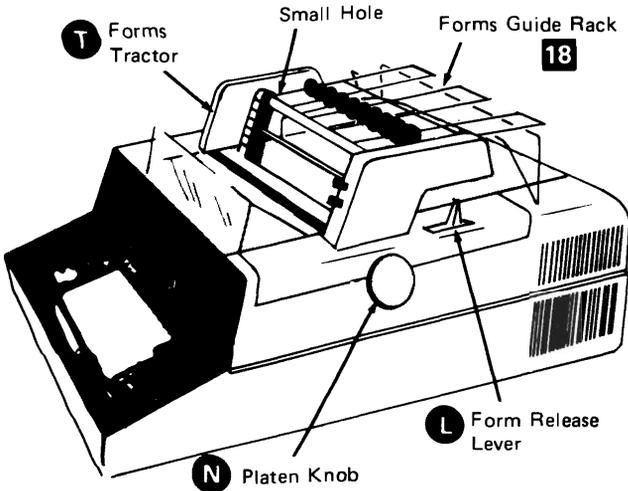


Printer

- Press down on the back until the back arms snap into position, then rock forward gently until the bottom of the tractor is against the platen covers **J** **K**. Rotate the platen knob **N** to be sure that the gears are engaged and the pins of the tractors move.



- Install the forms guide rack **18** if not already installed. Hold the forms guide rack **18** vertically and attach the ends of the guide into the small holes at the inside top of the tractor housing. Then lower the guide rack towards the rear of the terminal until it rests parallel with the top of the terminal.



To remove the forms tractor from the printer:

- Remove paper from the printer.
- Pull the tractor up and forward until the rear arms snap loose.
- Lift the forms tractor off the machine.

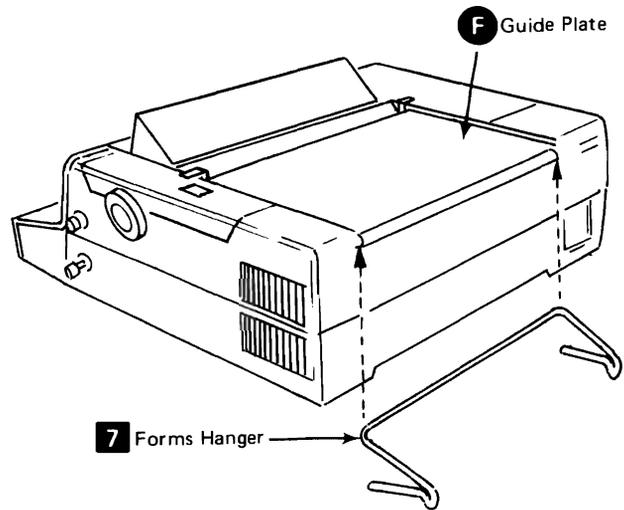
## ATTACHING THE PAPER ROLL HOLDER AND FORMS GUIDE

The paper roll holder and forms guide assembly holds a supply of roll paper at the back of the terminal or guides the paper when feeding single part continuous forms.

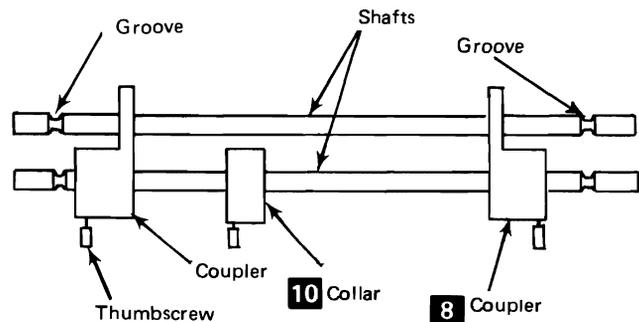
*Note:* The words "left" and "right" used in this section refer to the directions (left and right) as seen from the back of the machine.

### For Use With Continuous Forms

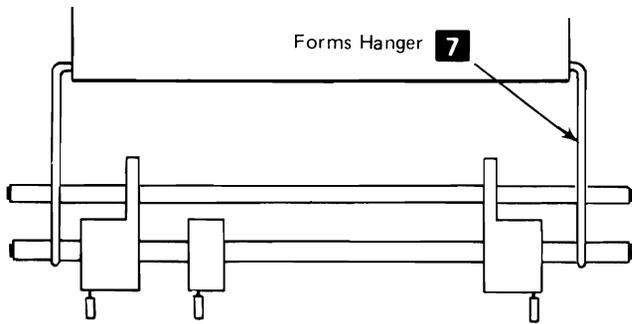
- Attach the forms hanger **7** by snapping it into the curved rear edge of the forms guide plate **F**.



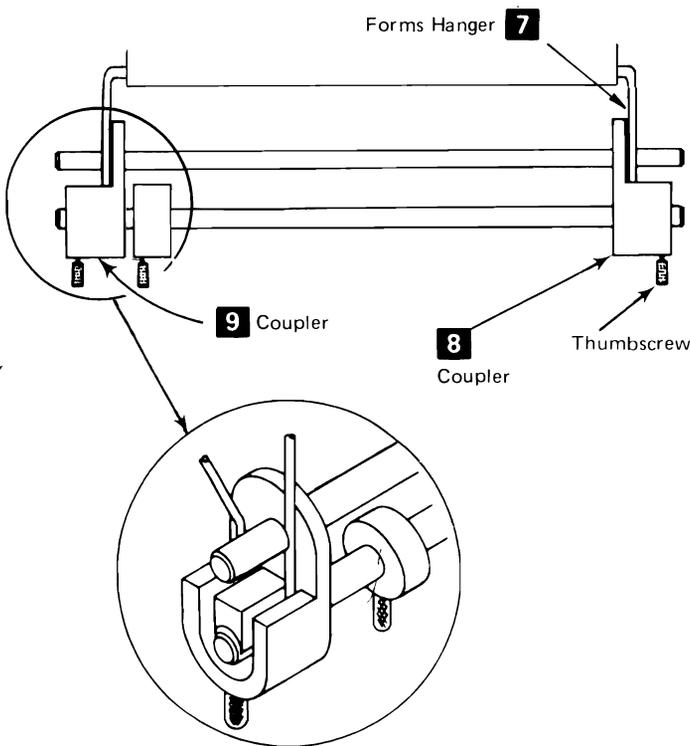
- Assemble the shafts as shown. If the form you are using will bind between the collar **10** and right coupler **8**, even if the collar **10** is positioned at the extreme left in step 5, assemble the shafts omitting the collar.



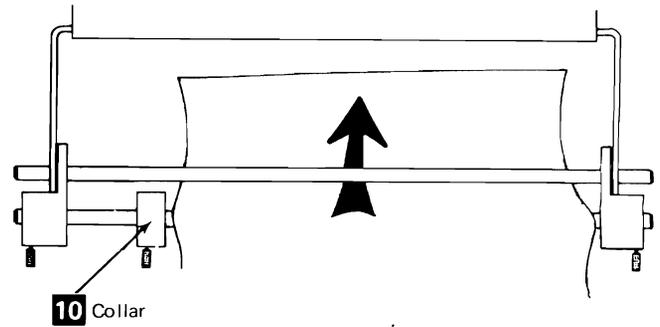
3. Attach the assembly to the hanger **7**. The grooves in the shafts must be aligned with the looped ends of the hanger.



4. Loosen the coupler thumbscrews and move the couplers **8** and **9** against the looped ends of the forms hanger, as shown. Then tighten the thumbscrews.

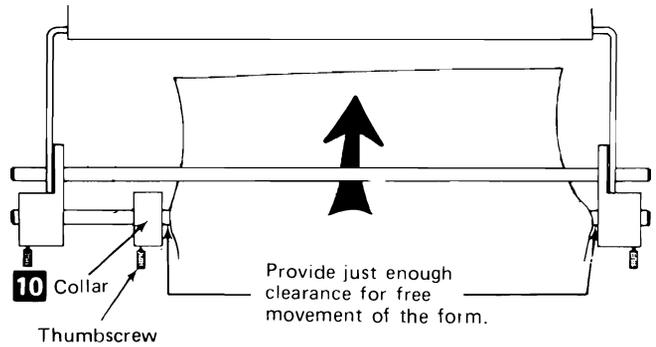


5. Insert the form between the shafts as shown (if the forms tractor is not used).

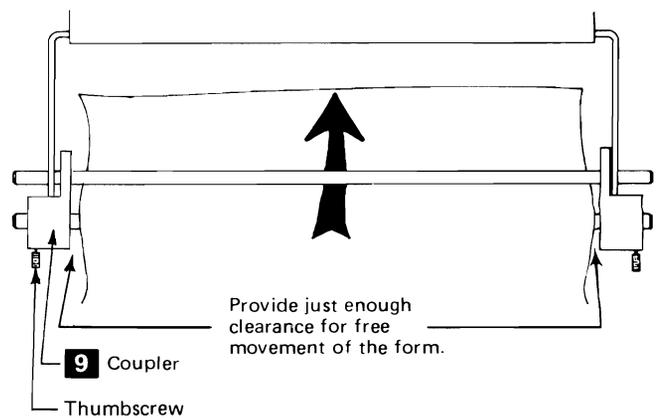


If you assembled the shafts with the collar, and if the form you are using binds as it passes between the shafts, even if the collar **10** is positioned at the extreme left, remove the form, go back to step 2, and reassemble the shafts omitting the collar.

6. If you assembled the shafts with the collar, adjust the position of the collar **10** to provide just enough clearance for free movement of the paper. Then tighten the thumbscrew.



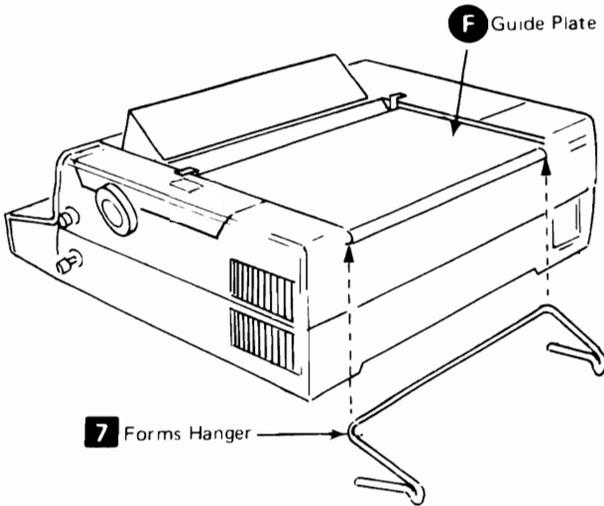
If you assembled the shafts without the collar, adjust the position of the left coupler **9** to provide just enough clearance for free movement of the form. Then tighten the thumbscrew.



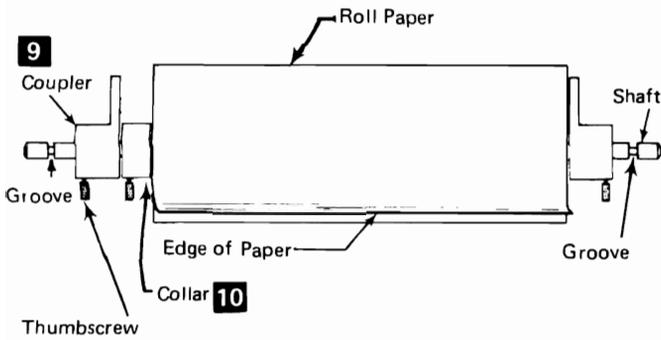
**For Use With Roll Paper**

When you are using roll paper, only one shaft is used.

1. Attach the forms hanger **7** by snapping it in the curved rear edge of the guide plate **F**.

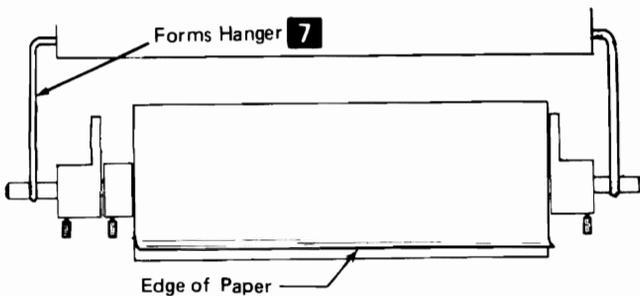


2. Assemble the shaft and paper roll as shown. Slide the paper roll onto the shaft so that paper feeds to the printer from the bottom of the roll.

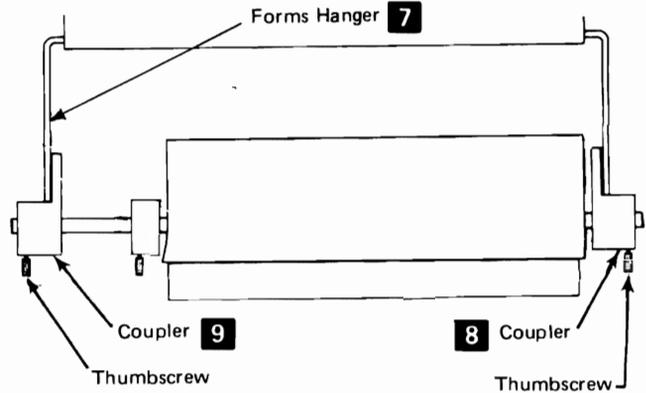


If the paper roll you are using binds when the paper is fed, even if the collar **10** is positioned at the extreme left, assemble the shaft and paper roll without the coupler **9** and collar **10**.

3. Attach the assembly to the hanger **7**. The grooves of the shaft must be aligned with the looped ends of the hanger.

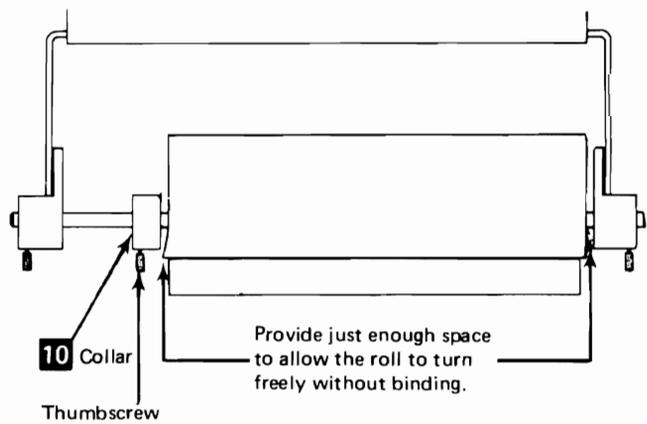


4. If you assembled the shaft and paper roll with couplers and collar, loosen the coupler thumbscrews and move the couplers **8** and **9** against the forms hanger **7** as shown. Then tighten the thumbscrews.

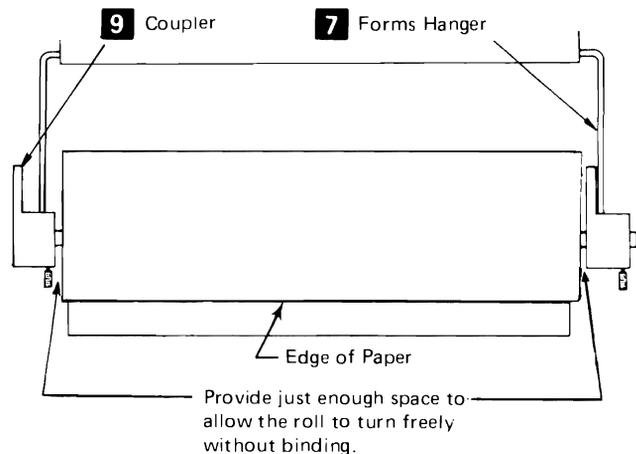
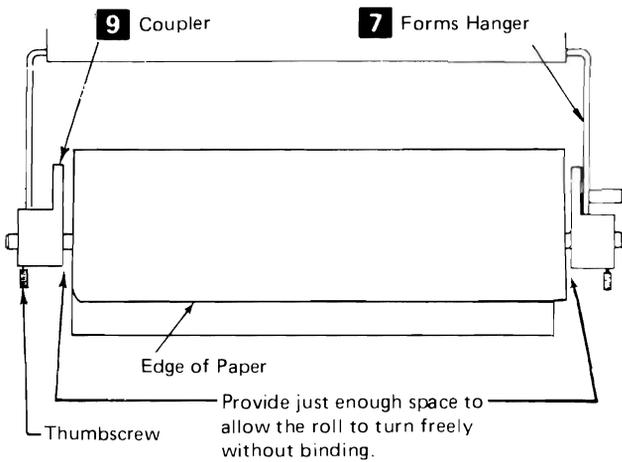


If you assembled the shaft and paper roll without the left coupler and collar, move the coupler **8** against the right looped end of the forms hanger. Then tighten the thumbscrew.

5. If you assembled the shaft and paper roll with the couplers and collar, loosen the collar thumbscrew and move the collar **10** against the paper roll, providing just enough space to allow the roll to turn freely without binding. Then tighten the thumbscrew.



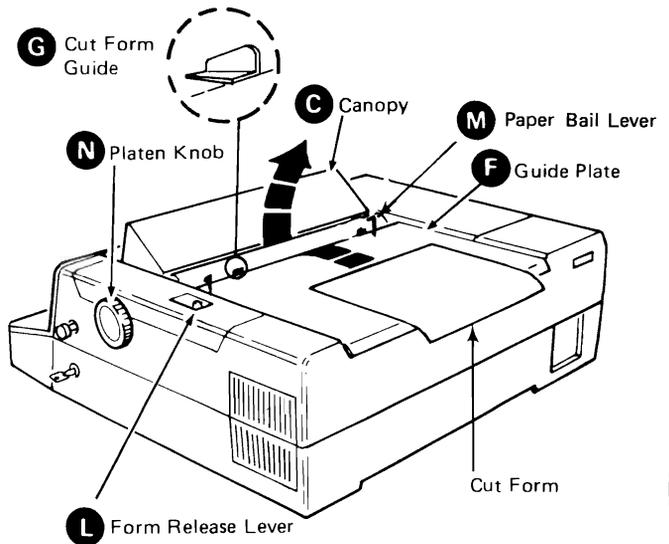
If you assembled the shaft and paper roll without the collar and left coupler, attach the coupler **9** from inside or outside of the forms hanger **7** so that it can provide just enough space between the end of the coupler and the paper roll to allow the roll to turn freely without binding. Then tighten the thumbscrew.



## INSERTING CUT FORMS

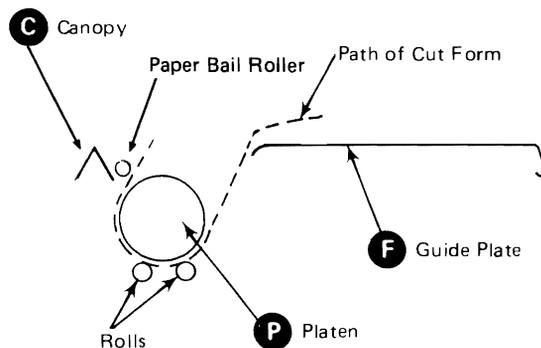
To insert a cut form for the first time, do the following. For repeated insertion of cut forms, ignore steps 1, 4, and 9; and use the cut form guides **G** for horizontal alignment.

1. Remove the forms tractor if installed on your terminal.
2. Press and hold the CODE key, then press and release the Form Load key and release the CODE key. The print head moves to the extreme left position. The ANR displays .
3. If the paper bail assembly is installed, move the paper bail lever **M** to the back of the terminal to move the paper bail rollers away from the platen. If only cut forms are to be used, the paper bail assembly should be removed.



Printer

4. Move the form release lever **L** to the back position.
5. Slide the cut form guides **G** to their respective extreme left and right positions.
6. Swing the canopy **C** up and forward.
7. Insert the form into the slot between the guide plate **F** and the platen **P**.



*Note:* If the form is inserted to the right of the rubber platen groove, it cannot be moved left beyond the groove in step 9.

8. Rotate the platen knob **N** to advance the form around the platen, until you can pick up the leading edge of the form. (There will be no clicking sound such as you hear when turning a typewriter platen.)
9. Pull the form release lever **L** forward and align the form for printing position and straight feeding. Then move the form release lever **L** to the back position.
10. Slide the cut form guides **G** to the edge of the paper.
11. Swing the canopy **C** back to its original position.
12. Press and hold the CODE key, press and release the Form Ready key, and then release the CODE key. The print head moves to the print position, and the terminal is ready for operation.

*Note:* The end-of-forms sensing is not active while the form release lever is in the back position.

## INSERTING CONTINUOUS FORMS WITH VARIABLE WIDTH FORMS TRACTOR

You can use continuous forms with or without the variable width forms tractor on the 3767.

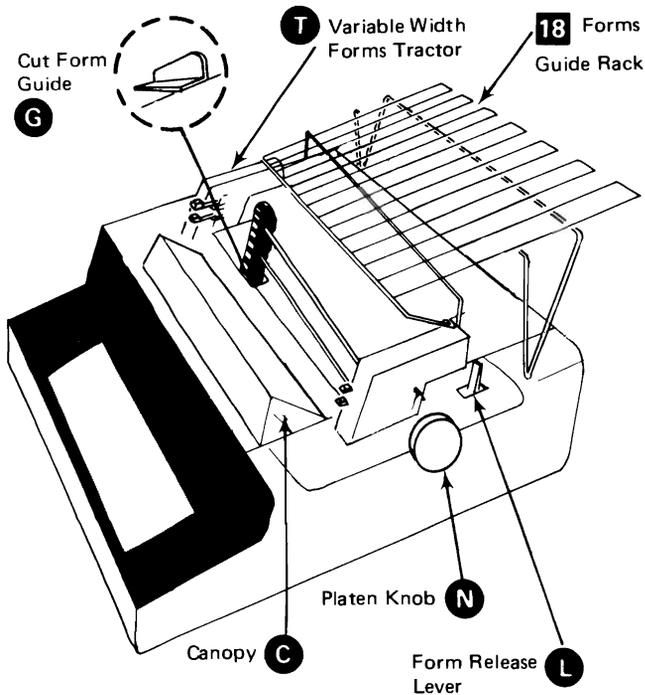
**Caution:** Align the stack of continuous forms to be printed horizontally so that the forms will feed evenly.

Avoid piling up the forms already printed on top of the forms being fed. The weight of the outgoing paper may affect form feeding and printing alignment.

Position the form release lever to the front position when the variable width forms tractor is used. This allows form feeding to be completely controlled by the variable width forms tractor and prevents overlap printing.

1. Remove the paper bail assembly if installed.

2. Attach the variable width forms tractor **T**



3. Press and hold the CODE key, then press and release the Form Load key, and release the CODE key. The print head moves to the extreme left position. The ANR displays .

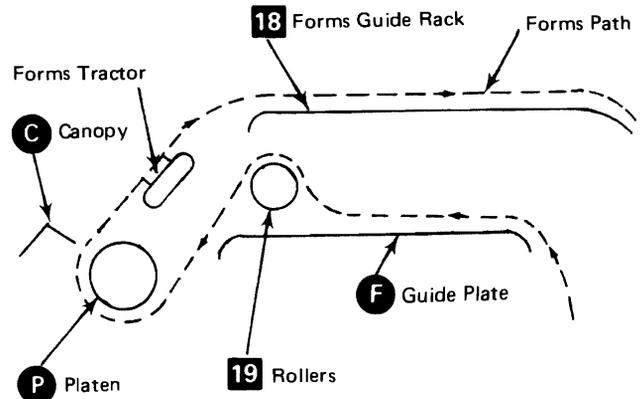
4. Slide the cut form guides **G** to their respective extreme left and right positions.

5. On machines equipped with the static eliminator, there are two paper guides **U** on the forms guide rack. Move the guides to their extreme left and right positions.

6. Swing the canopy **C** up and forward.

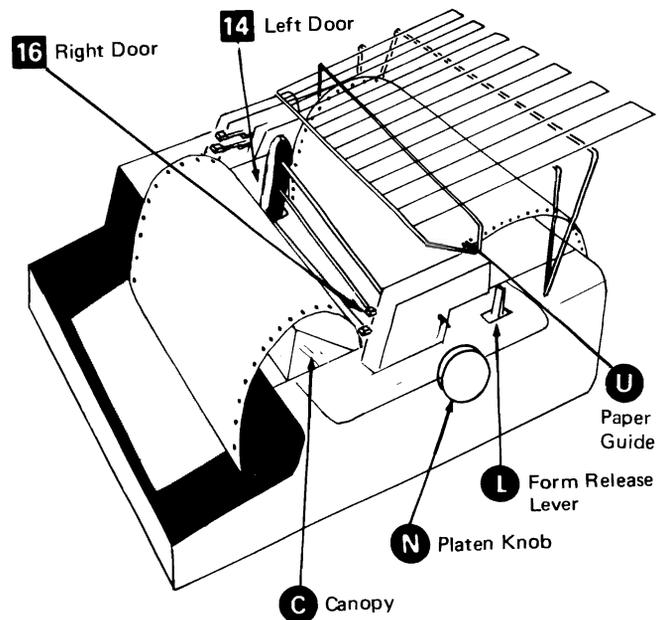
7. Move the form release lever **L** to the back position.

8. Insert the leading edge of the form under the forms guide rack **18**, over the rollers **19** of the forms tractor unit and down into the slot between the guide plate **F** and the platen **P**, keeping the form as far to the left as possible.



**Note:** If the paper roll holder and forms guide is installed, the form can be inserted either over or under the shafts of the holder and forms guide.

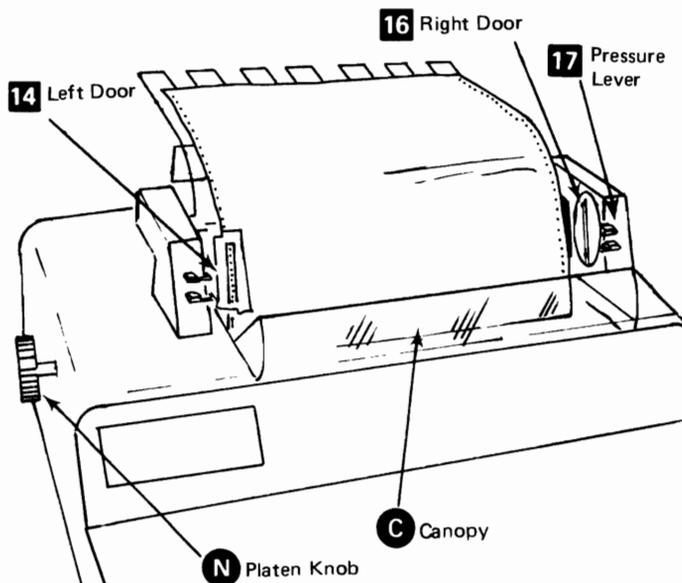
9. Rotate the platen knob **N** to advance the form around the platen, until the holes of the form cover the tractor pins. (There will be no clicking sound such as you hear when turning a typewriter platen.)



10. Open the doors **14** **16** covering the pins on each side of the forms tractor.

11. Holding the leading edge of the form with your hand, pull the form release lever **L** forward.

12. Align the holes in the left margin of the form over the pins of the left tractor so that the holes in the form engage the pins properly, then close the door **14**
13. If necessary, squeeze the pressure levers **17** on the right tractor and adjust its position so that the pins of the right tractor engage the holes in the right margin of the form properly, then close the door **16**



14. Swing the canopy **C** back to its original position.
15. If vertical alignment of the form with the print head is required, do it by rotating the platen knob **N**.
16. Slide the paper guides **U** so that they lightly touch the edges of the form. Rotate the platen to ensure there is no binding of the forms on the paper guides.
17. Press and hold the CODE key, then press and release the Form Ready key, and then release the CODE key. The print head moves to the print position and the terminal is ready for operation.

#### INSERTING CONTINUOUS FORMS WITHOUT VARIABLE WIDTH FORMS TRACTOR

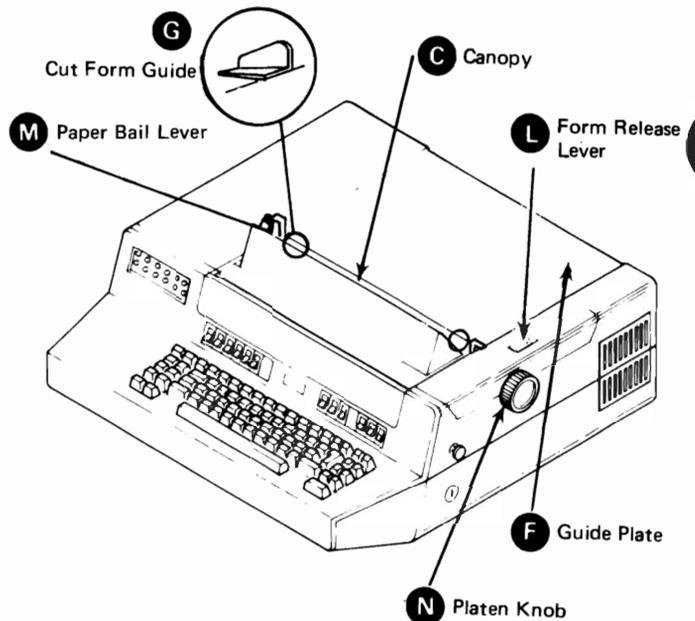
You can use continuous forms with or without the variable width forms tractor on the 3767.

**Caution:** Align the stack of continuous forms to be printed horizontally so that the forms will feed evenly.

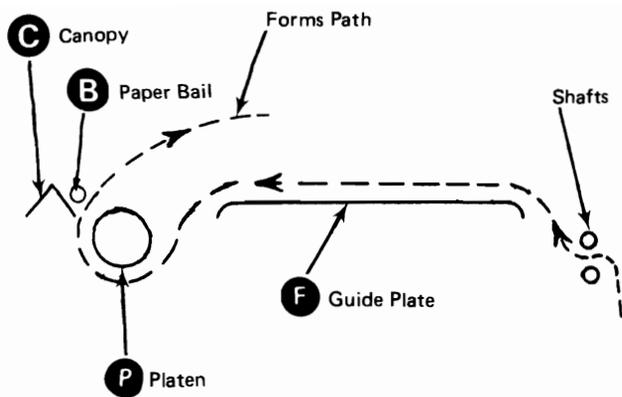
Avoid piling up the forms already printed on top of the forms being fed. The weight of the outgoing paper may affect form feeding and printing alignment.

Position the form release lever to the front position when friction feed is used. This allows form feeding to be completely controlled by the platen and prevents overlap printing.

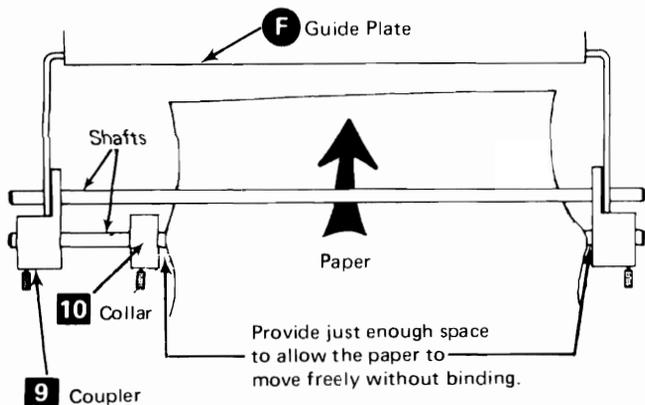
1. Press and hold the CODE key, then press and release the Form Load key and release the CODE key. The print head moves to the extreme left position. The ANR displays .
2. If the paper bail assembly is removed, install it.
3. Move the paper bail lever **M** to the back to move the paper bail rollers away from the platen.



4. Slide the cut form guides **G** to their respective extreme left and right positions.
5. If you have the paper roll holder and forms guide, attach it. (The method of assembly varies depending on the width of the form. Refer to "Attaching the Paper Roll Holder and Forms Guide".)
6. Swing the canopy **C** up and forward.
7. Move the form release lever **L** to the back position.
8. Insert the leading edge of the form between the shafts of the paper roll holder and forms guide (if attached), into the slot between the guide plate **F** and the platen **P**, keeping the left edge of the form approximately even with the left end of the platen.



9. Rotate the platen knob **N** to advance the form around the platen **P** until you can pick up the leading edge of the form. (There will be no clicking sound such as you hear when turning a typewriter platen.)
10. Holding the leading edge of the form, pull the form release lever **L** forward.
11. Insert the leading edge of the form between the platen **P** and paper bail **B**, and align the form for printing position and straight feeding, keeping the left edge of the form approximately even with the left end of the platen. Then move the paper bail lever **M** forward to hold the form with the paper bail rollers.
12. Swing the canopy **C** up and back to its original position.
13. If the paper roll holder is being used, slide the collar **10** or coupler **9** (depending upon the width of the form) on the paper shaft to the edge of the form to help straight feeding of the form. Provide just enough space to allow the paper to move freely without binding. Then tighten the thumbscrew.



14. If vertical alignment of the form with the print head is required, do it by rotating the platen knob **N**.
15. Press and hold the CODE key, then press and release the Form Ready key, and then release the CODE key.

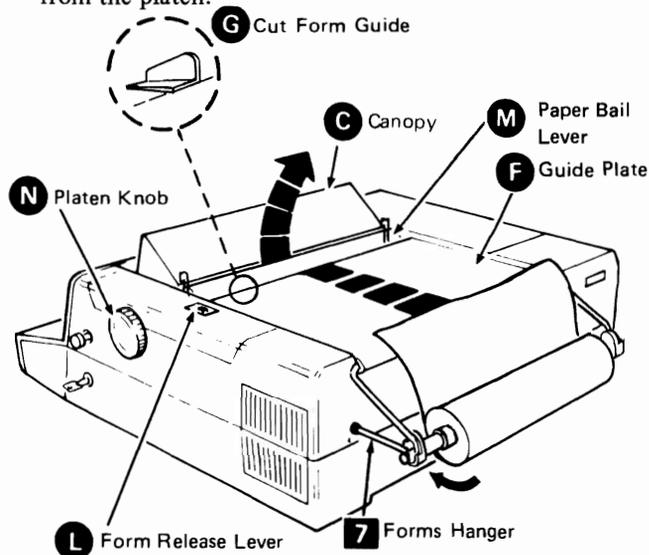
The print head moves to the print position, and the terminal is ready for operation.

*Note:* Using continuous forms without using the forms tractor may require occasional repositioning of the form to ensure correct feeding or to keep the desired printing registration.

### INSERTING ROLL PAPER

To use roll paper, you must have a paper roll holder and forms guide assembly attached to the rear of the terminal.

1. Remove the forms tractor if installed on your terminal.
2. Press and hold the CODE key, then press and release the Form Load key, and release the CODE key. The print head moves to the extreme left position. The ANR displays 000.
3. If the paper bail assembly is installed, move the paper bail lever **M** back to move the paper bail rollers away from the platen.



4. Slide cut form guides **G** to their respective extreme left and right positions.
5. Move the form release lever **L** to the back position.
6. Attach the forms hanger **7**. Slide the shaft through the center of the paper roll and place the shaft on the forms hanger **7**. (The method of assembly varies depending upon the width of the form. Refer to "Attaching the Paper Roll Holder and Forms Guide".)

*Note:* Place the shaft on the hanger so that paper feeds to the printer from the bottom of the roll as shown in the above figure.

7. Swing the canopy **C** up and forward.
8. Insert the form into the slot between the guide plate **F** and the platen, keeping the left edge of the paper approximately even with the left end of the platen.

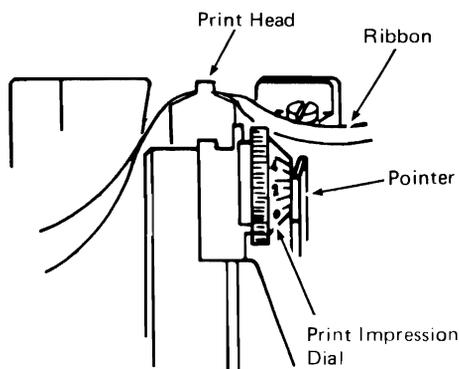
9. Rotate the platen knob **N** to feed the paper around the platen, between the platen and the paper bail roller, until you can pick up the leading edge of the paper.
10. Pull the form release lever **L** forward and align the paper for printing position and straight feeding. Then move the paper bail lever **M** to the front to hold the paper with paper bail rollers and platen.
11. Swing the canopy **C** up and back to its original position.
12. Press and hold the CODE key, then press and release the Form Ready key, and then release the CODE key. The print head moves to the print position and the terminal is ready for operation.

*Note:* Using roll paper may require occasional adjustment of the form to ensure correct feeding or to keep the desired printing registration.

### SETTING THE PRINT IMPRESSION DIAL

The print head moves toward the platen as the print impression dial is turned toward "0". The scale should be adjusted according to the thickness of the forms. The guide for setting the dial is as follows:

- a. The starting point for single-part forms is low on the scale; the starting point for multipart forms is high on the scale.
- b. If the ribbon smudges the first sheet, rotate the print impression dial toward "8", one step at a time, until the smudging stops.
- c. If the last copy is not legible, turn the print impression dial toward "0".



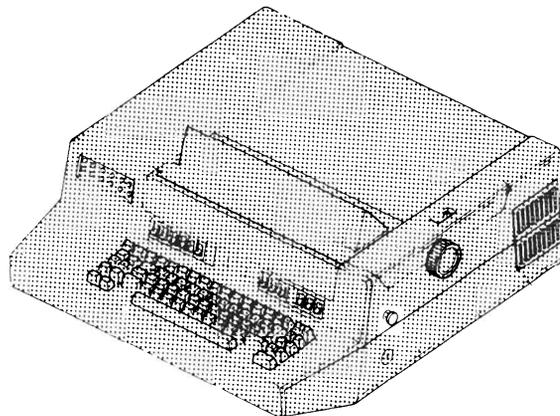
### FINE ADJUSTMENT OF THE PRINT POSITION

After inserting preprinted forms, you may need to make horizontal and vertical fine adjustments to print at a predetermined position.

#### Horizontal Fine Adjustment

Rotate the horizontal fine adjustment knob on the right side of the terminal so that the horizontal print position aligns with a predetermined print position on the form. The maximum adjustment range is about 1½ spaces.

*Caution:* Do not force the knob. If you cannot align the printing, rotate the knob in the opposite direction about midway between stops, re-align the form horizontally, and try the adjustment again.



Printer

#### Vertical Fine Adjustment

Rotate the left or right platen knob until the print line (horizontal line on cut forms guide) is in the desired vertical position.

*Note:* To move the form backward, pull the form from behind the printer and rotate the platen knob backward.

### HORIZONTAL FORMAT CONTROL

Horizontal format control consists of establishing left and right margins and setting and/or clearing tab stops; it can be done in either local or communicate mode. Turning the Comm/Local switch to the opposite position after setting the tab stops does not change the settings.

#### Margin Setting

The left margin is the print position where you want printing to start. The right margin is set to establish the reference for a warning signal near the end of the printed line. An audible alarm sounds when the print head passes ten positions before the right margin.

The terminal can print outside established margins, but can never print beyond the extreme ends of the print line. 1 and 132. If this is attempted, the Oprn Check light comes on and you must press the RESET key to resume normal operation.

When power is turned on, the terminal automatically sets the left margin at 1 and the right margin at 132. When you set a new margin, the old one is cleared automatically.

The procedure for setting the margins is:

1. Be sure the terminal is idle and the Calc switch is off (if present).
2. Determine the printing position(s) where you want to set the margin(s).
3. Space or backspace the print head to the position where the ANR displays the position(s) in step 2.

4. Press and hold the CODE key.
5. If setting the left margin, press and release the Left Margin Set key (numeric 9).  
If setting the right margin, press the Right Margin Set key (numeric 0).
6. Release the CODE key.
7. Press the Return key.

### Tab Setting and Clearing

When tab stops are set, pressing the Tab key moves the print head to a predetermined position, and the ANR indicates that position.

If the terminal is operating under SDLC line control, pressing the Tab key at or after the last tab stop position causes an audible alarm and an operation check. When no tab is set, pressing the Tab key causes a space operation.

If the terminal is operating under S/S line control, pressing the Tab key at or after the last tab stop position causes the audible alarm to sound, the print head to move toward the right-most print position, and the ANR to display 132. The same condition occurs if the Tab key is pressed when no tab is set.

The procedure for setting and/or clearing tab stops is as follows:

1. Be sure the terminal is idle.
2. Turn the Calc switch off.
3. Determine the printing position(s) where you want to set or clear tab stops.
4. Move the print head to the position(s) in step 3 by pressing any character key, the Space, Backspace, or Tab keys.

*Note:* A normal printer operation takes place when you press these keys, and the ANR indicates the next print position.

5. Press and hold the CODE key.
6. To set a tab, press and release the Tab Set key (numeric 7). To clear a tab, press and release the Tab Clear key (numeric 8).
7. Release the CODE key.
8. Repeat steps 4 through 7 for all the tab stops.

Tab stops can be set at any print position between the left margin and print position 132. Once you set a tab stop, it remains set until it is cleared or power is turned off. (Under SDLC control, the host may set margins, tabs, and VFC format.) All tab stops are clear when you turn power on, and must be set again.

### Verification of Margin and Tab Setting

1. Press the Return key. The ANR should display the print position of the left margin and the print head should be at that position.
2. Press the Tab key. The ANR should display the print position of the first tab stop and the print head should be at that position.

3. Repeat step 2 for all tab stops.
4. Press the Tab key at last tab stop position.  
For S/S: Audible alarm sounds, the print head moves to the last print position, and the ANR displays 132.  
For SDLC: Audible alarm sounds and the Oprn Check light comes on.
5. Verify that the audible alarm sounds when the print head is ten positions before the right margin, by spacing or printing to that position. (It may be necessary to first return the print head to the left.)

### VERTICAL FORMAT CONTROL

Vertical Format Control is a feature that enables the operator to arrange the vertical format of entered data for efficient operation.

When you want to print on a line several lines from the current line, VFC allows the form to advance quickly to that line under keyboard or host control.

Vertical tabs can be set at any line and on as many lines as you wish. Each time you press the VERT TAB key, you advance the form to the next tab stop line. You can advance the form to the starting line of the next page by pressing the FORM FEED key. If you press the Return, (INDEX, or VERT TAB key) at the bottom margin line, the Oprn Check light comes on to notify you that the form must be advanced. Press the RESET key and then the FORM FEED key to advance the form to the next page.

The VFC operation can be performed in either local or communicate mode, but operates only if the SDLC-S/S switch was set to SDLC before power-on.

Turning the Comm/Local switch to the opposite position after setting the VFC data does not change the settings.

The following guidelines must be followed when setting vertical format parameters:

1. The maximum form size that can be controlled by this feature is 102 lines.
2. The bottom margin line number must not be greater than the page size line count.
3. Vertical tab stops can be set at any line down to the bottom margin.
4. If you reach the end of a line when entering VFC tabs, the carrier automatically returns for further entries. Do not press the Return key until all numbers are entered. Pressing the Return key ends the VFC setting operation.

To clear VFC settings manually, press and release the Vert Form Set key while holding the CODE key; then press the Return key. (VFC settings clear automatically when power is turned off, or when the terminal enters SDLC communicate mode.)

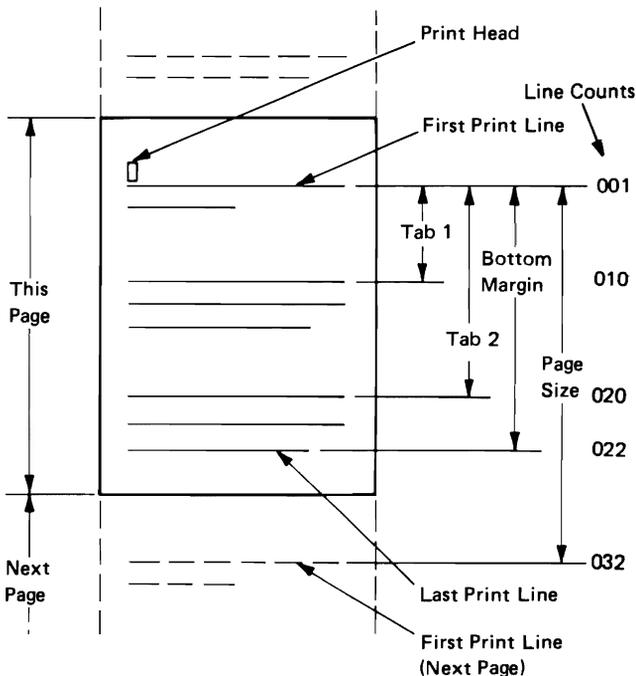
## Determining the VFC Line Numbers

*Note:* Be prepared to record the numbers as you do this procedure. Save these numbers; you will need them each time you use this form.

1. Insert the form that you intend to use for this operation, aligning the first print line with the print head.
2. Set the Double Space/Single Space switch to the same position you will be using during your operation.
3. Press the INDEX key repeatedly until the first tab position on the form aligns with the print head. Add one to the number of times you pressed the key to determine the tab line count for the first VFC tab stop.
4. Repeat step 3 to determine the cumulative line count for any additional VFC tab stops required.

*Note:* The line count is always a cumulative total in reference to the first print line of the form.

5. Press the INDEX key repeatedly until the last print line aligns with the print head. Add one to the total count of INDEX key operations from the first print line of the form to determine the line number for the bottom margin.
6. Press the INDEX key repeatedly until the first print line of the next form aligns with the print head. Add one to the grand total cumulative count of INDEX key operations to determine the number of lines in the page size.



## Setting VFC Numbers

Follow this procedure to enter the vertical forms control settings.

1. Turn the Calc switch off.
2. Press and hold the CODE key.
3. Press and release the Vert Form Set key (numeric 6), then release the CODE key. This clears all VFC data that may already be stored.
4. Key in three-digit line number(s) using one of the following formats:
  - Page size,bottom margin,tab,tab, . . . ,tab\*
  - Page size, bottom margin
  - Page size
5. Press the Return key to end the VFC setting operation.

\*In the above example the setting is:

032,022,010,020

## Verification of VFC Numbers

If set in local mode, verify in local mode; if set in communicate mode, verify in communicate mode.

To check that the VFC numbers are correctly set:

1. Press the FORM FEED key.
2. Insert the appropriate form in the printer.
3. Advance the form manually (by rotating the platen knob) so that the first line aligns with the print head.
4. Press the VERT TAB key.
  - The form advances and stops at the first tab position. (If you did not set any tabs, a line feed takes place.)
5. Check to see that the tab stop aligns with the print head. If it does not, set all VFC numbers again.
6. Repeat steps 4 and 5 until all tab stops are verified.
7. Press the VERT TAB key again (after the last tab).
  - The Oprn Check light comes on. Press the RESET key to continue operation. If the Oprn Check light does not come on, at least one extra tab was set; since all VFC numbers must be correctly set at one time, do the "Setting VFC Numbers" procedure again.
8. Press the INDEX key until the Oprn Check light comes on.
9. Check to see that the bottom margin aligns with the print head. If it does not, set all VFC numbers again.
10. Press the FORM FEED key. The paper advances, then stops.
11. Check to see that the first line of the next form aligns with the print head. If it does not, set all VFC numbers again.

Printer



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## Chapter 4. Operating the Terminal in Communicate Mode

The overall sequence of communicate mode operation is:

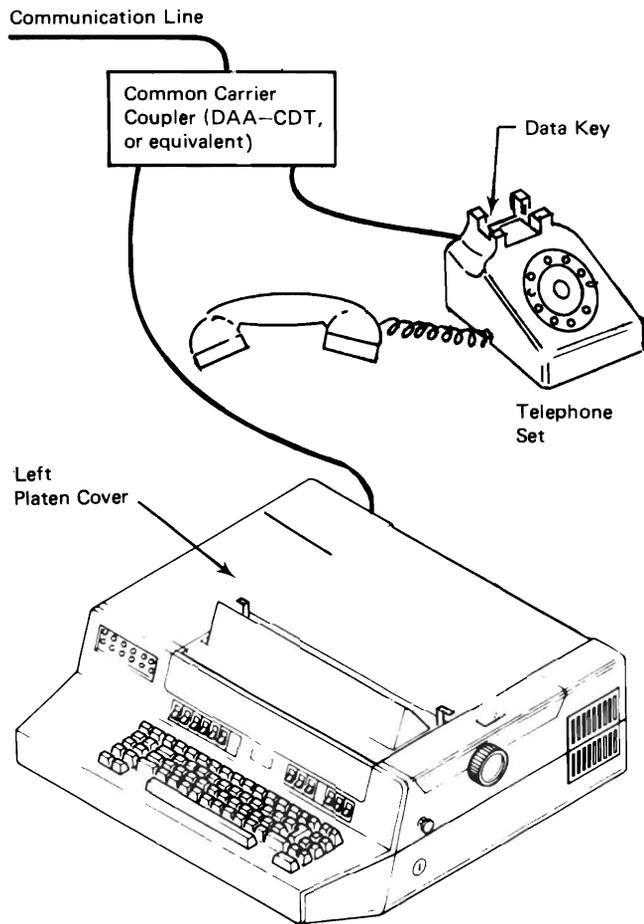
1. Establish a connection—select the procedure that is appropriate for your equipment configuration.
2. Initiate communication—select the appropriate procedure.
3. Transmit and/or receive—select the appropriate line control procedure.
4. Terminate communication.

### ESTABLISHING A CONNECTION

For operation in communicate mode, the 3767 must be connected to the remote unit by a communication line. The following illustrations show typical arrangements, and the operator actions required to connect the 3767.

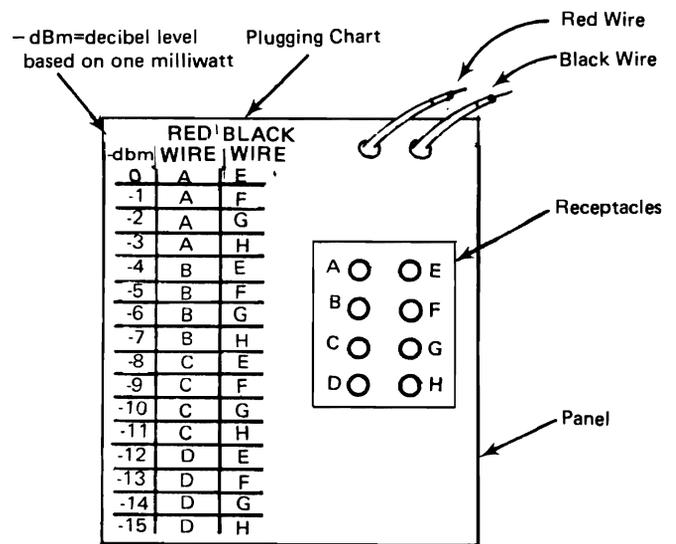
*Note:* Before performing the following steps, set the switches as described in step 1 of “Initiating Communicate Operations” located later in this chapter.

#### Switched Line—Integrated Modem (USA and Canada)



1. Perform this step only if you are in the U.S. or Canada—and you are about to communicate with the host for the first time since the terminal was installed or relocated. Otherwise, go to step 2.
  - a. Determine the decibel (dB) level of the telephone line: the level (-8, for example) should be indicated on the telephone company receptacle and coupler, which are usually located on the floor or wall nearby; if you cannot find the dB level number, contact your local telephone company customer service representative.
  - b. Compare the dB level of the telephone line with the level that is set on your terminal: to determine the dB level of your terminal, look under the left platen cover. There you will see a panel with two wires attached, one red and one black. On the left side of the panel is a chart that indicates the receptacles into which the red and the black wires should be plugged for various dB level settings. New terminals are pre-plugged for -10dB (red wire plugged into “C” and black into “G”).
  - c. If the decibel level of your terminal is the same as that of the telephone line, go to step 2.

If the decibel level of your terminal is not the same as that of the line, change the terminal setting to make it equal. To do so, replug the wires according to the chart. For example, if the dB level should be set for -8dB, plug the red wire into the “C” receptacle and the black wire into the “E” receptacle. Go to step 2.



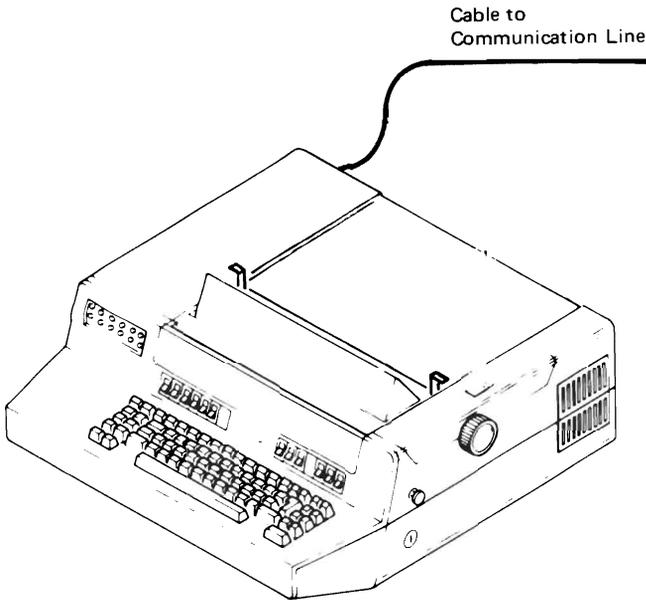
Comm Mode

2. Pick up the telephone handset and dial the host.
3. When the host's answer tone is heard, immediately switch from *Talk to Data* by pulling up the Data key on the telephone set. Lay the handset aside. (The procedure may differ for some types of telephone sets. Refer to the instructions for your equipment.)

In 2741 with interrupt operation, after hearing the low frequency tone, which follows the high frequency tone, switch from *Talk to Data*. Then turn the Comm/Local switch to Comm.

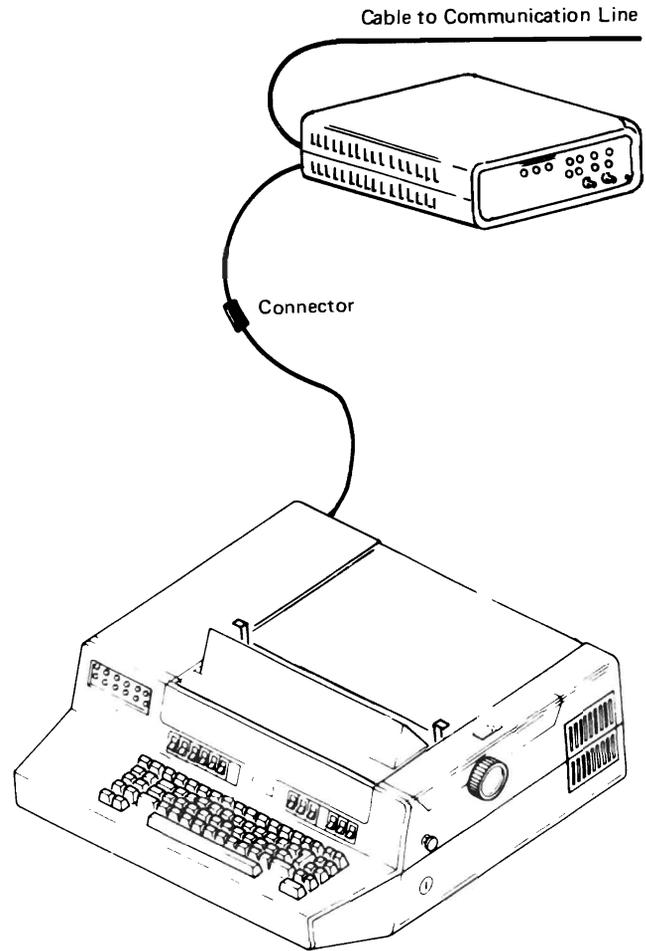
4. If the answer tone is not heard, or if noise or cross talk is heard along with the tone, the connection is probably not satisfactory for communication. Hang up and redial for a more satisfactory connection.

*Non-Switched Line—Integrated Modem*



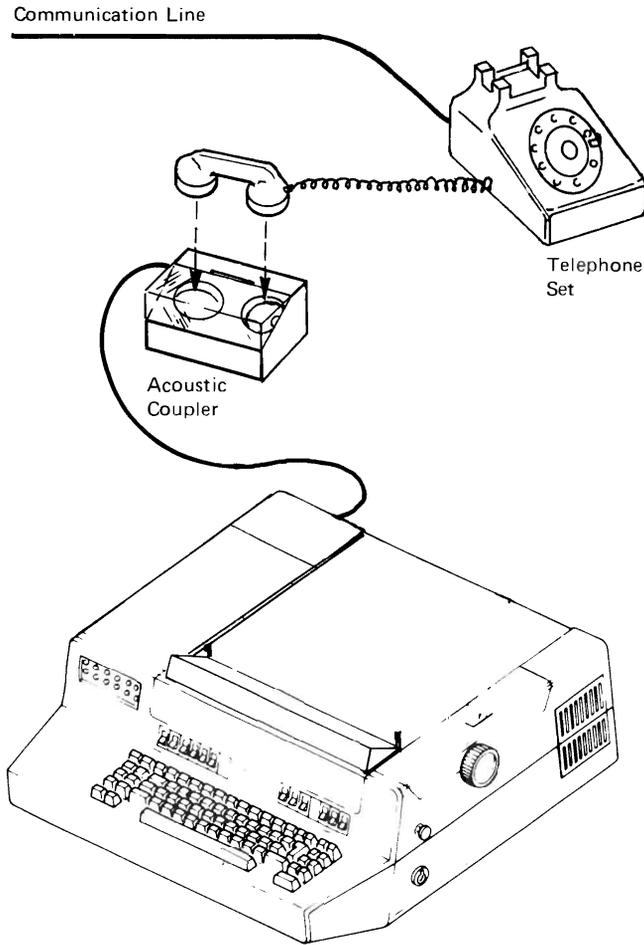
The communication line is connected during installation. No operator action is required.

*Non-Switched Line—IBM 3872 Modem (External Modem)*



The modem power must be on, the modem must be in data mode, and the OPER/TEST switch on the modem cable connector must be in the OPER position. Follow any procedures necessary for modem operation. If you have an IBM 3872 Modem, refer to "IBM 3872 Modem User's Guide," GA27-3058, for procedures.

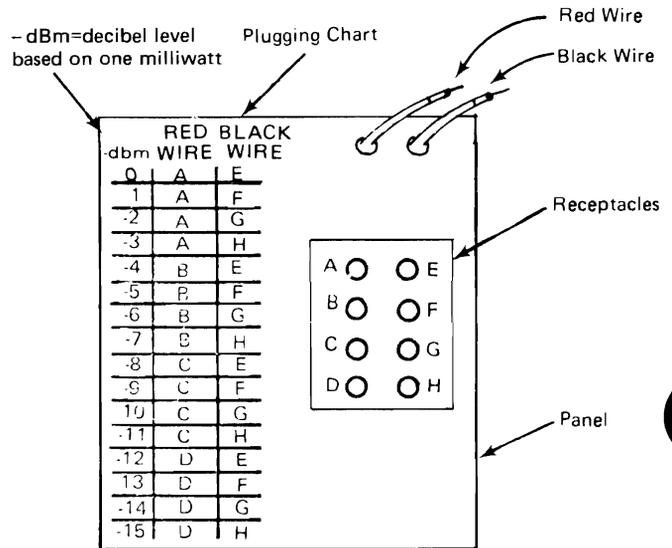
## Acoustic Coupler—Integrated Modem



**Caution:** The decibel (dB) level setting on your terminal must match the decibel level of the acoustic coupler. Whenever you change acoustic couplers or you are not sure the levels match on your present arrangement, follow the procedure in step 1 below. Otherwise, go to step 2.

1. Perform this step to ensure the decibel (dB) level setting of the terminal matches the decibel level of the acoustic coupler.
  - a. Determine the decibel level of the acoustic coupler. This number (-8 for example) will be written on a label on the underside of the acoustic coupler.
  - b. Compare the dB level of the acoustic coupler with the level that is set on your terminal. To determine the dB level of your terminal, look under the left platen cover. There you will see a panel with two wires attached, one red and one black. On the left side of the panel is a chart that indicates the receptacles into which the red and the black wires should be plugged for various dB level settings. New terminals are preplugged for -10dB (red wire into "C" and black wire into "G").

- c. If the decibel level of your terminal is the same as that of the acoustic coupler, go to step 2. If the decibel level of your terminal is not the same as that of the acoustic coupler, change the terminal setting to make it equal. To do so, replug the wires according to the chart. For example, if the dB level should be set for -8dB, plug the red wire into the "C" receptacle and the black wire into the "E" receptacle. Go to step 2.



2. To connect the acoustic coupler to the telephone line:
  - a. Set the Comm/Local switch to Local.
  - b. Pick up the telephone handset and dial the host location.
  - c. Listen for the host's answer tone on the handset.
 

*Note:* If a tone is not heard, or if noise or cross talk is heard the connection is probably not satisfactory for communication. Hang up and redial for a more satisfactory connection.
  - d. Raise and hold the the plastic cover. Insert the telephone handset firmly into the acoustic coupler and close the cover.
  - e. Turn the Comm/Local switch to the Comm position.

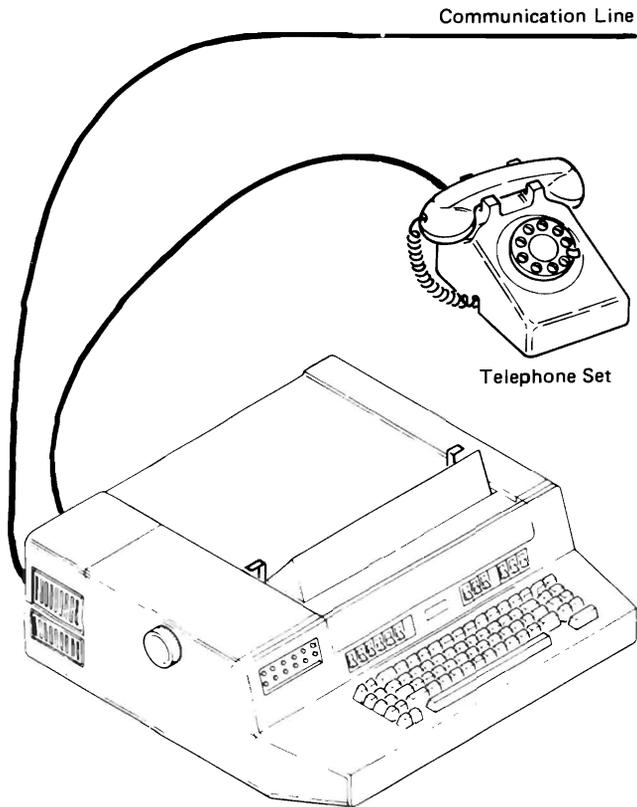
*Note:* In online operation when receiving from the host, if the Normal Signal light is on, communication should be entirely satisfactory. The Normal Signal light may also be on when transmitting. If the online operation is unsatisfactory, or the Weak Signal indicator is lit and the Normal Signal light blinks or is off when receiving from the host, try reseating the handset firmly into the acoustic coupler; redialing may be necessary for a more satisfactory connection. If both lights are off, the online operation will be unsatisfactory. Redial the host and reseat the handset firmly into the acoustic coupler.

To disconnect the telephone line:

1. Be sure the communicate operation is complete.
2. Turn the Comm/Local switch to the Local position.
3. Remove the telephone handset from the coupler.
4. Return the telephone handset to the cradle.

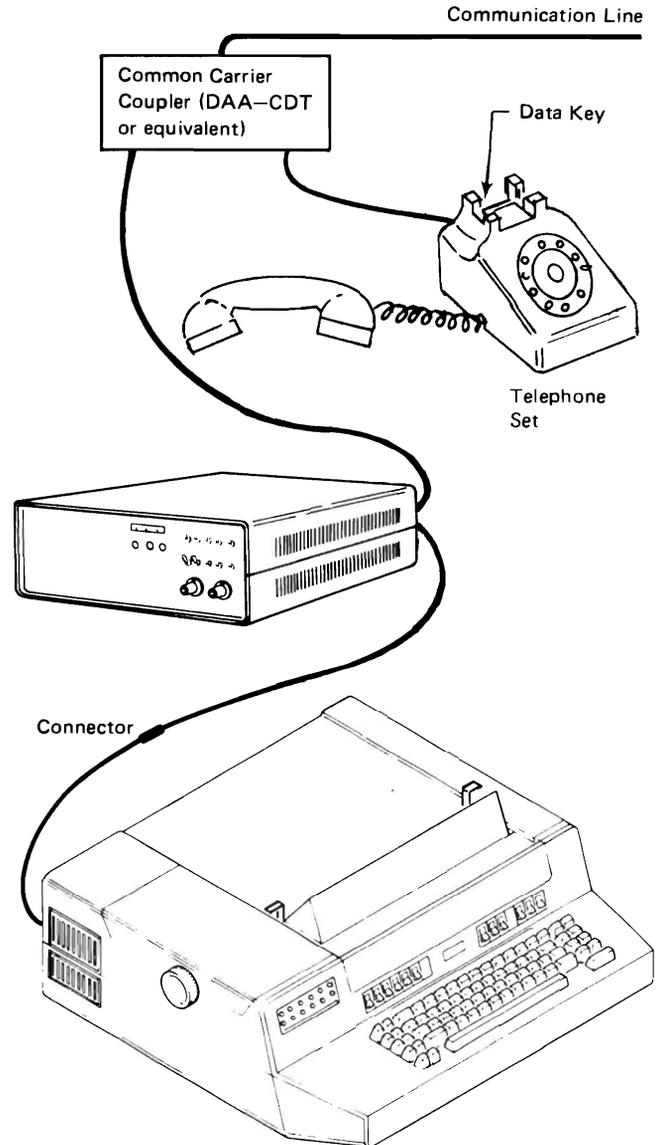
Comm  
Mode

*Switched Line—Integrated Modem (World Trade Only)*



1. Set the Comm/Local switch to Local.
2. Set the Data/Talk switch to Talk.
3. Pick up the telephone handset and dial the host.
4. Listen for the host's answer tone on the handset.
5. Turn the Data/Talk switch to Data.
6. When the tone ends, set the Comm/Local switch to Comm position.
7. Return the telephone handset to the cradle.

*Switched Line—IBM 3872 Modem (External Modem)*



Use your modem procedures if they are available. If you have an IBM 3872 Modem, refer to "IBM 3872 Modem User's Guide," GA27-3058, for procedures. If not, proceed as follows:

1. Turn the OPER/TEST switch on the modem cable connector to the OPER position.
2. Pick up the telephone handset and dial the host.
3. Listen for the host's answer tone on the handset.
4. When the tone ends, promptly pull up the data key on the telephone set and set the Comm/Local switch to the Comm position.
5. Lay the handset aside. (The procedure may differ for some types of telephone sets. Refer to the instructions for your equipment.)

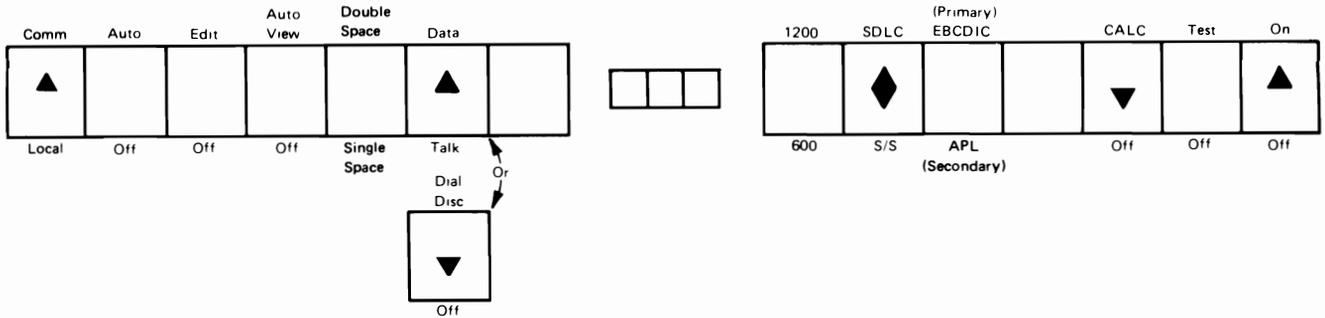
If the answer tone is not heard, or if noise or cross talk is heard along with the tone, the connection is probably not satisfactory for communication. Hang up and redial for a more satisfactory connection.

## INITIATING COMMUNICATE OPERATIONS

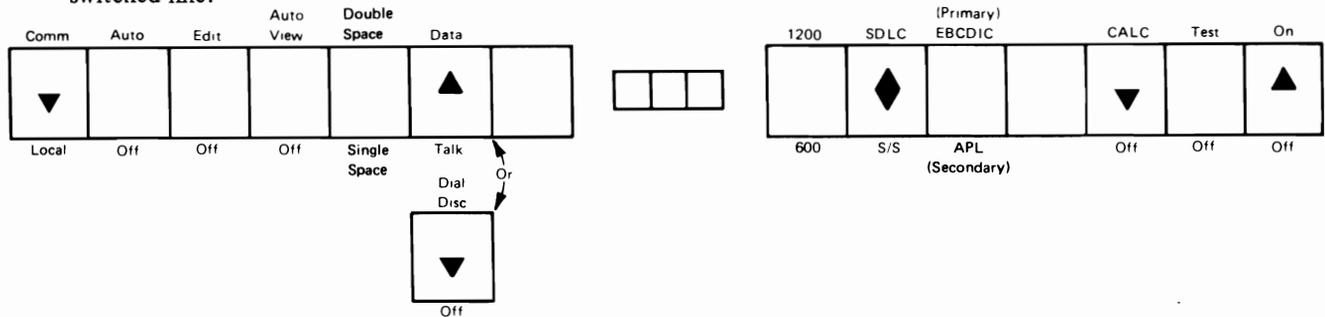
**Caution:** The SDLC-S/S switch must be set to the selected position *before* power on.

To do any transmit or receive operations, you must set up and/or check the following after power is on.

1. Set the switches as follows.
  - a. Without the acoustic coupler.



- b. With the acoustic coupler or integrated modem—switched line.



2. Establish a communication line connection as described at the beginning of Chapter 4.
3. Be sure the Data Set Ready light is on. (If the acoustic coupler is used, the normal signal light should be on when receiving data.)

After making these preparations, turn to the page describing your terminal line control:

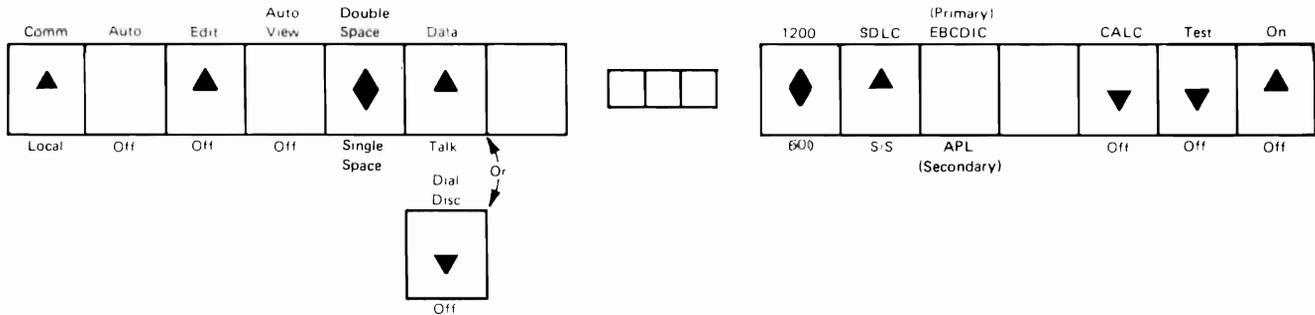
- SDLC — page 4-7
- 2740-1 — page 4-15 (Point-to-Point)
- 2740-1 — page 4-19 (Station Control)
- 2740-2 — page 4-25
- 2741 — page 4-33

**Note:** A communicate operation procedure depends on the host program, which may vary from system to system. Check with your supervisor for any additional or different steps that your company's application requires for 3767 terminal operation.



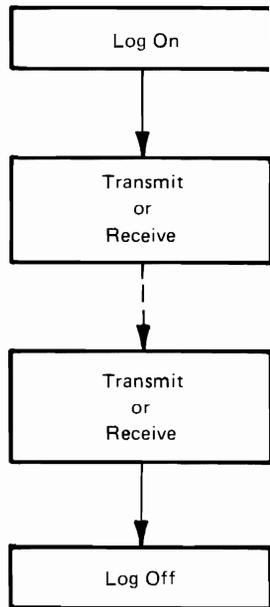
## SDLC LINE CONTROL OPERATION

When operating the terminal under SDLC line control all data keyed in is stored in the buffer. If you do not need to edit data for transmission, turn the Edit/Off switch Off and ignore the description for data correction. The switch settings of the terminal should be as follows.



### Log On and Log Off

To start an SDLC communicate operation you must log on, and to end a communicate operation you must log off.



Comm Mode

Log-on opens a communication session between your terminal and the host program. Log-off ends the session between your terminal and the host program.

1. Press the SYS REQ key. The Proceed light comes on. If pressing the SYS REQ key causes an Oprn Check light condition, press the RESET key.
2. Key in the data required to start (for log-on) or close (for log-off) the communicate operation.

Log On [Application name] [Station mode]  
[Optional data]

Log Off [Application name] [Conditional/unconditional]

3. Press the EOM key. The Proceed light goes off.

*Note:* Do not press the EOB, ATTN, or CNCL keys during these operations.

Keyed-in characters are not printed if printing is inhibited by the host program (Print Inhibit light is on); the printer spaces each character. Received data is always printed; keyed-in or received functions (such as carrier return and tabs) are always performed. (When the Comm/Local switch is turned to Local, the condition is restored.)

The audible alarm sounds with each character entered into the last ten positions of the buffer. If the buffer is full, the Proceed light goes off and you cannot store any more data. You must transmit the data in the buffer by pressing the EOB key to continue the key-in operation.

If the data you sent is not received correctly by the host, the System Check light comes on and the ANR displays an error code '170'. See *IBM 3767 Models 1, 2, and 3 Communication Terminal Problem Determination Guide*, for instructions if you receive no instructions from the host and have no application procedures.

The host can prevent or stop your terminal from operating by sending a special signal to the terminal. If this signal is received the CPU Select light comes on. The Proceed light goes off, and the keyboard will not work. Any data you have keyed, but not transmitted, is lost. (See "Conditions for Transmitting Stored Data" under "Correction of Data Stored in the 3767 Buffer", later in this chapter. You must wait for the CPU Select light to go off to resume your operation. (This light is turned off by host when it is ready to communicate with your terminal again.)

The host can request that you stop your transmit operation by turning on the CPU Select light. The Proceed light stays on and you can continue to key in and transmit data, but you must end the transmit operation (by pressing the EOM key) as soon as you can. After the transmit operation ends your terminal will receive data from the host.

In receive operation, the terminal starts printing after successfully receiving a data block.

You can ask the host to stop sending data by pressing the ATTN key. The program may:

- A. Ignore the attention signal and continue to transmit to your terminal.
- B. End its transmit operation and allow your terminal's Proceed light to turn on. You can then key in data for transmission.

If your terminal is receiving and does not receive anything for 20 seconds, the System Check light comes on, ANR displays 163, and the On Line light goes off. This condition is automatically cleared by the host. You may have to log on again before you can continue. Contact your system support representative.

When the EOB or EOM key is pressed with no data entry in the following conditions, a signal with no data is transmitted to the host.

- a. After pressing the SYS REQ key
- b. After pressing the EOB key in transmit operation
- c. After ordering your terminal to be in the transmit state from the host.

## Transmit Operation

When the host program is ready for a session with your terminal, the On Line light comes on.

1. Log-on (if you have not already done so).
2. Wait for the Proceed light to come on.
3. Key in the data to be transmitted, or read a magnetic stripe card. (This data is stored in the buffer.)
4. Edit the stored data, if required. See "Correction of Data Stored in the 3767 Buffer," later in this chapter.
5. To transmit the stored data you have keyed-in:
  - a. Press the EOB key if you have more data to transmit.
  - b. Press the EOM key if the last of the data is stored in the buffer.
  - c. If the Auto/Off switch is in the Auto position, you can also transmit the data by pressing the Return key or the FORM FEED key, as appropriate.
  - d. If the Edit switch is off, transmission is automatic every 256 characters.
6. If you pressed the EOB key, the Proceed light stays on. You can key in more data immediately. If the buffer becomes full, the Proceed light goes off and no more data is stored. When the Proceed light comes on again, you can continue.

If you pressed the EOM key, terminal status varies depending upon the host program.

  - a. If the Proceed light stays on, you can continue.
  - b. If the Proceed light goes off and then comes on again, you can continue when it comes on again.
  - c. If the Proceed light goes off, and does not come on again, your terminal may receive and print data from the host. If you have more data to transmit, wait for the Proceed light to come on after printing stops.
7. When all data has been transmitted and received and the terminal is idle, perform a log-off.

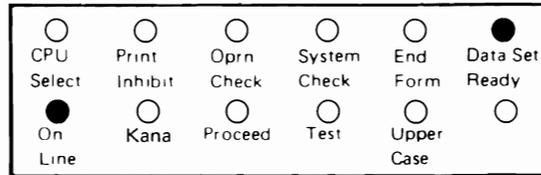
## Receive Operation

After log-on, your terminal is ready to receive data when the host starts the session. Your terminal will receive and print data without your assistance.

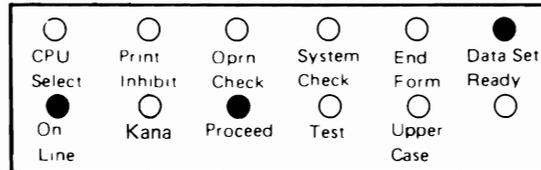
Log-off when the communicate operation is complete.

Example of SDLC Transmit Operation

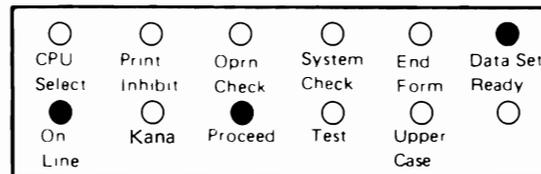
After power on and terminal is ready for a session.



Press SYS REQ key.

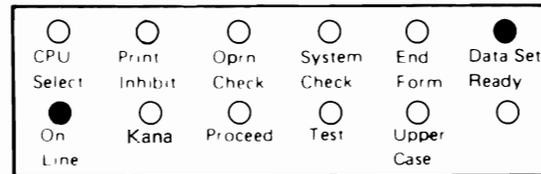


Key in data for log on.

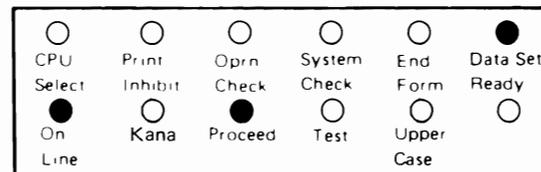


Comm Mode

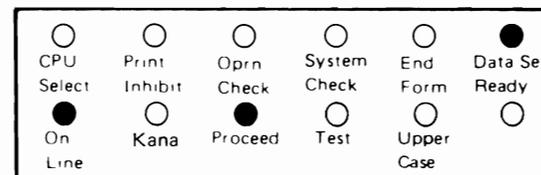
Press EOM key.



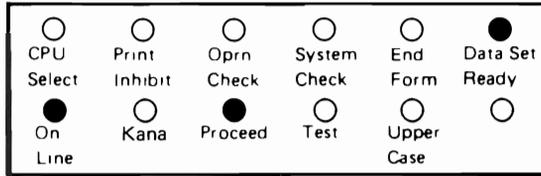
Wait for the Proceed light to come on, then key in the data.



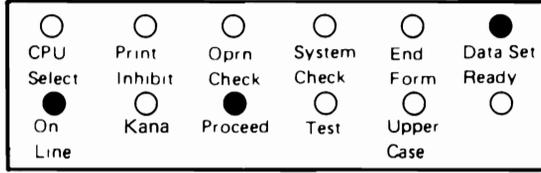
Press EOB key.  
 Note: The Proceed light may or may not stay on. If it goes off, it will come on again shortly, and you can continue.



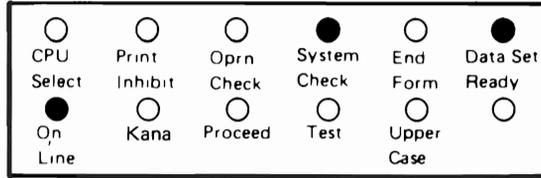
Key in data.



Press EOB key.

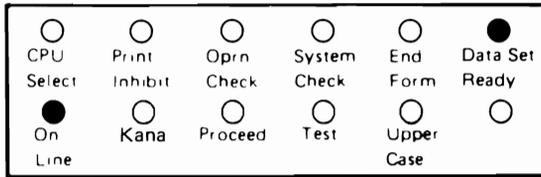


Data transmission was not successful.

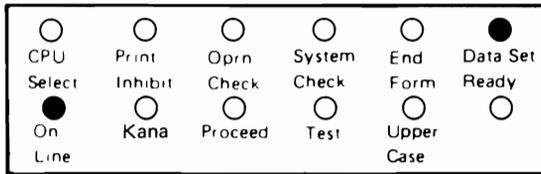


1 7 0

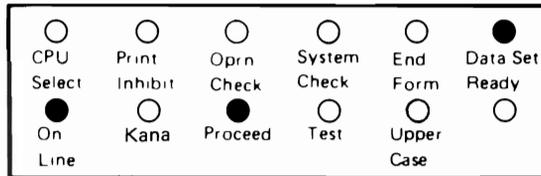
The System Check light will be turned off automatically.



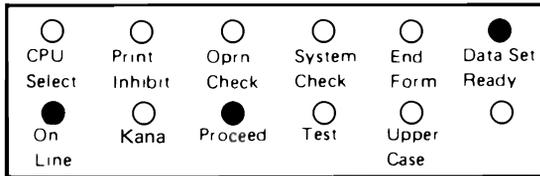
You may receive a message to recover the condition.



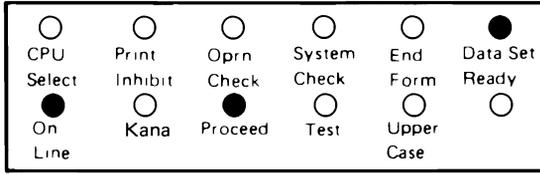
Wait for the Proceed light, then key in the data.



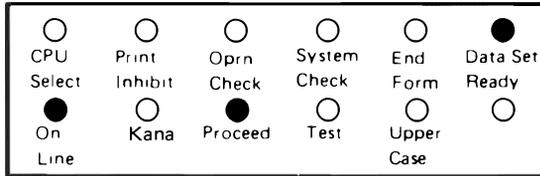
Read a magnetic stripe card.



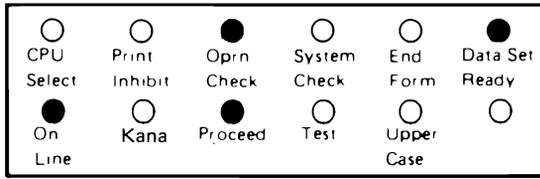
Press EOB key.



Read a magnetic stripe card.

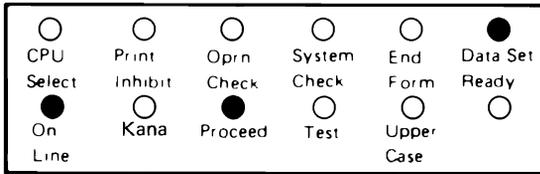


The reading of a magnetic stripe card was not successful.

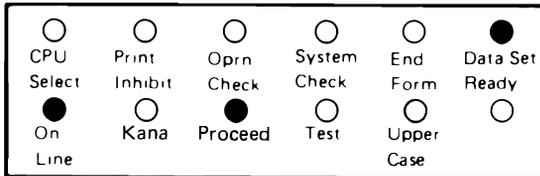


Comm Mode

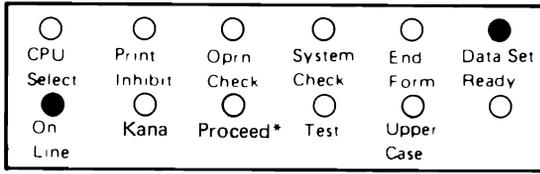
Press RESET key.



Read a magnetic stripe card.



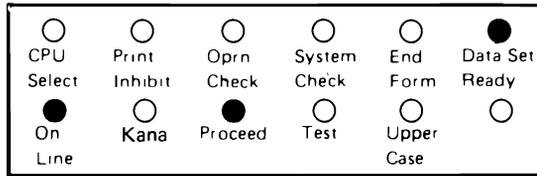
Press EOM key.



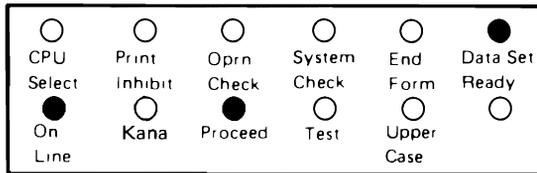
\*Proceed Light may stay on.

Resume the transmit or receive operation.

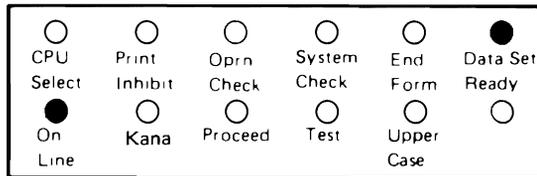
Press SYS REQ key.



Key in data for log off.

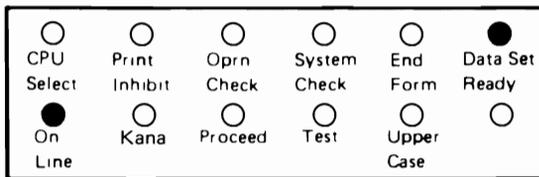


Press EOM key.

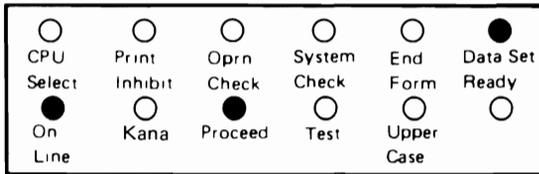


Example of SDLC Receive Operation

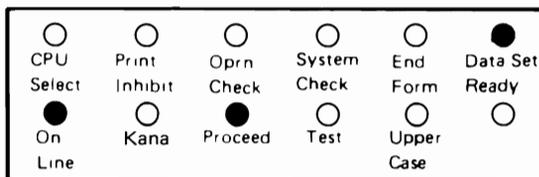
After power on.



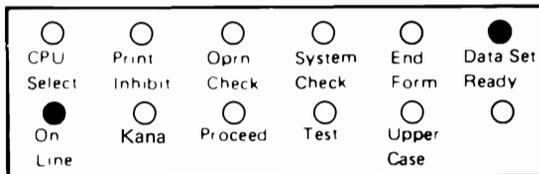
Press SYS REQ key.



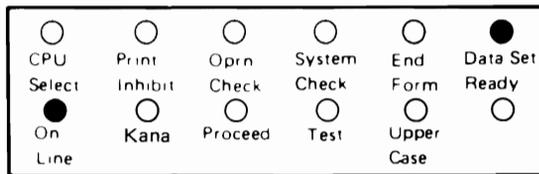
Key in data for log on.



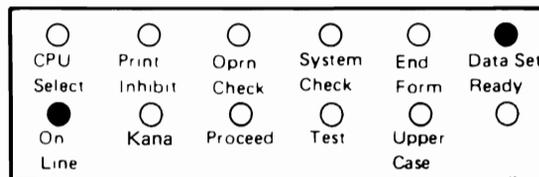
Press EOM key.



Receive data. After a data block is received successfully printing of it starts.

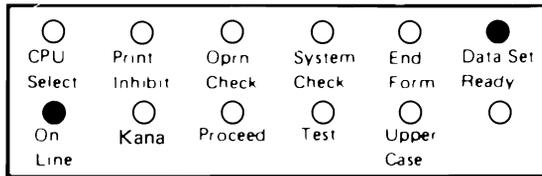


Receive data.

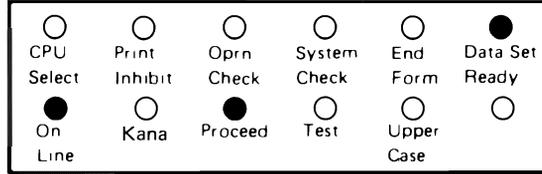


Comm Mode

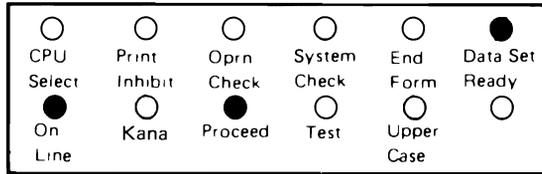
Press ATTN key, if you have to send urgent data.



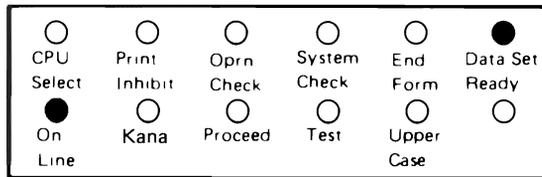
Wait for the Proceed light to come on, then key in data.



Press EOM key.

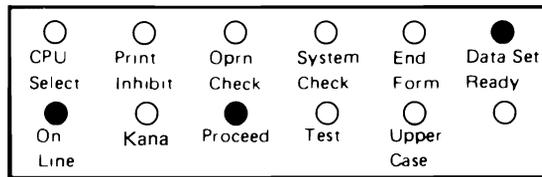


Receive data.

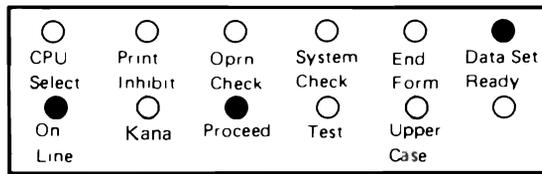


Resume the receive or transmit operation.

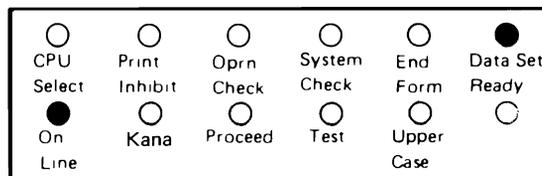
Press SYS REQ key.



Key in data for log off.

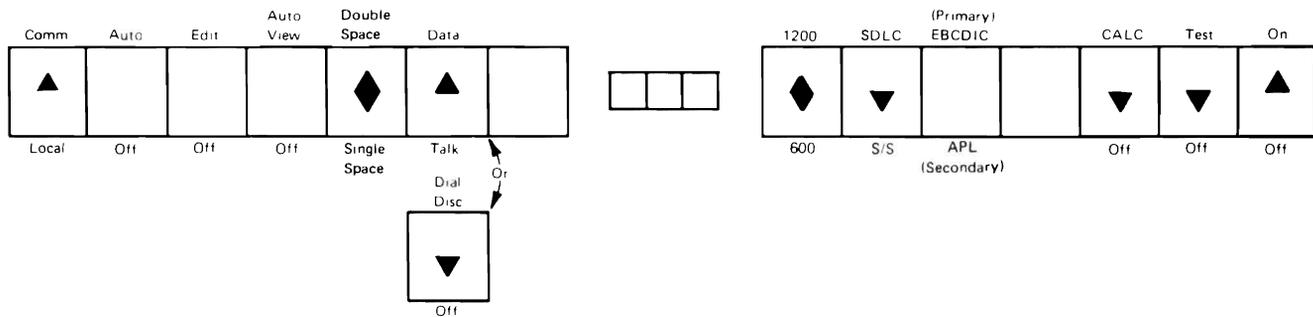


Press EOM key.



## 2740-1 LINE CONTROL, POINT-TO-POINT OPERATION

The switch settings for the 2740-1 line control operation are:



Unlike the IBM 2740, the 3767 does not stop printing at the right margin. If your terminal is in local or calculate mode when the host requests it to receive, the audible alarm sounds.

Keyed-in or received characters are not printed if the host has signalled print inhibit. If printing is inhibited the Print Inhibit light comes on and the printer spaces for each character. Functions such as return or tab occur normally. The print inhibit condition is terminated by the host. If the condition is not terminated during communicate operation, printing is inhibited even after the terminal is changed to local mode.

### Receive Operation

After you have made basic preparations for a communicate operation, wait to receive data from the host.

The On Line light comes on when receiving starts.

After a data block is received, the On Line light goes off, then comes on again if more data is received.

If the On Line light does not come on again within a reasonable time, the receive operation is probably over.

Comm  
Mode

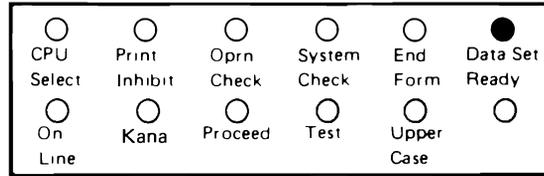
### Transmit Operation

After you have made basic preparations for a communicate operation, use the following procedure to transmit data.

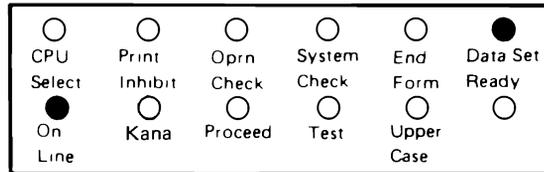
1. Press the SYS REQ key (same as Bid key on 2740-1).  
The On Line light comes on. The Proceed light comes on.
2. Key in the data to be transmitted (the Proceed light must be on).
3. After keying in a data block, press the EOB key (or press the Return key if the Auto/Off switch is set to Auto.)  
The On Line light goes off. (The On Line light will come on again when any response except © is received.) The Proceed light goes off, and then comes on again if the transmission of the data was successful. If the data transmission was not successful, you may receive a message from the host.
4. Continue to key in and transmit remaining data, repeat in steps 2 and 3.
5. When you want to end the transmit operation, press the EOM key. The Proceed light goes off. The On Line light goes off.

Example of 2740-1 (Point-to-Point) Operation

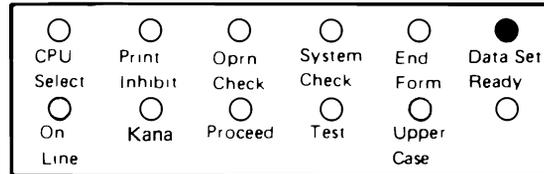
Standing by.



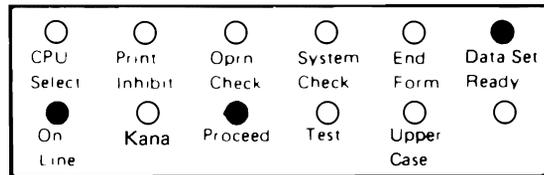
Receive data.



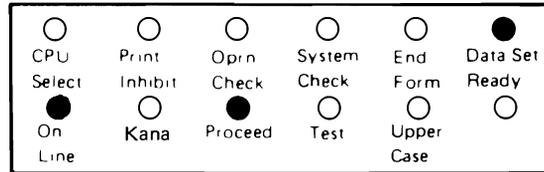
At the end of data block.



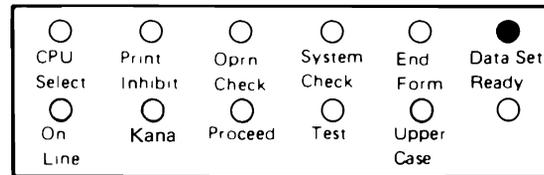
Press SYS REQ key. (Start of transmit operation)



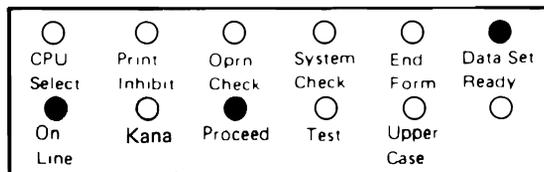
Key in data.



Press EOB key.



Wait for the Proceed light to come on, then key in data.



Press EOM key. (End of transmit operation)

<input type="radio"/>	<input checked="" type="radio"/>				
CPU	Print	Oprn	System	End	Data Set
Select	Inhibit	Check	Check	Form	Ready
<input type="radio"/>					
On	Kana	Proceed	Test	Upper	
Line				Case	

Standing by.

<input type="radio"/>	<input checked="" type="radio"/>				
CPU	Print	Oprn	System	End	Data Set
Select	Inhibit	Check	Check	Form	Ready
<input type="radio"/>					
On	Kana	Proceed	Test	Upper	
Line				Case	

Comm  
Mode



## 2740-1 LINE CONTROL, STATION CONTROL

Unlike the IBM 2740, the 3767 does not stop printing at the right margin.

Keyed-in or received characters are not printed if the host has signalled print inhibit. If printing is inhibited, the Print Inhibit light comes on and the printer spaces for each character. Functions such as return or tab occur normally. The print inhibit condition is terminated by a signal from the host. If the condition is not terminated during communicate operation, printing is inhibited even after the terminal is changed to local mode. (To reset the condition in local mode, you must turn the terminal power off.)

### Transmit Operation

After you have made basic preparations for a communicate operation, the On Line light will flash when the host is ready to receive data from your terminal.

Keyed-in characters are transmitted as each key is pressed.

If you are not ready to key in data every 15 seconds, you can press the PRINT VIEW key to prevent a time-out. This does not affect data transmission. (A time-out condition will also occur after an end-of-form condition if you do not resume keying within 15 seconds.)

If the data from your terminal is not received correctly by the host, the System Check light comes on and an ANR error code is indicated. See *IBM 3767 Models 1, 2, and 3 Communication Terminal Problem Determination Guide*, for instructions.

1. Press the SYS REQ key (same as Bid key on 2740-1). The On Line light comes on and stays on. The Proceed light comes on, and the alarm sounds.
2. Key in the data to be transmitted. Begin keying in data within 15 seconds after the Proceed light comes on. If the interval between characters exceeds 15 seconds, the On Line and Proceed lights go off, and the transmit operation ends. (This condition is called a time-out). If you have additional data to be transmitted, start the transmit operation again from step 1.

3. After keying in the data, press the EOB key (or press the Return key if the Auto/Off switch is set to Auto). The Proceed light goes off, and then comes on again after the data has been transmitted.
4. Repeat steps 2 and 3 until all data is transmitted.

When you want to end the transmit operation, press the EOM key (same as EOT on 2740-1). The Proceed light goes off, and the On Line light goes off. (This light may start flashing again if the host starts another operation with your terminal.)

### Receive Operation

During a 2740-1 station control receive operation, the host controls whether it will address an individual terminal address, a group address, or all-call address.

#### Individual Terminal Address Receive Operation

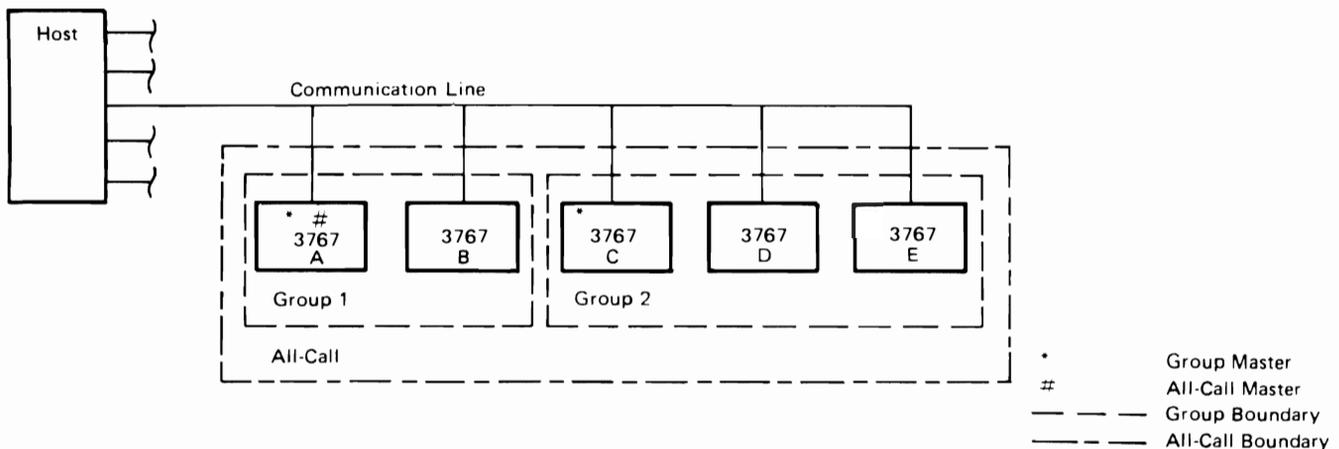
After you have made basic preparations for a communicate operation:

1. The terminal starts printing data as it is received from the host. The On Line light comes on and stays on.
2. After a block of data is received, the On Line light goes off, then comes on again if additional data is received.
3. After the last data block is received, the On Line light goes off.

The terminal is ready for additional receiving and will accept data from the host. If the On Line light flashes on and off, the host is ready to receive data from your terminal.

#### Group Address and All-call Address Receive Operations

When the host wants to send data to a specific terminal, it uses the individual terminal address operation. When it wants to send the same data to a group of terminals at the same time, it uses the group address operation. When it wants to send the same data to all terminals on a communication line at the same time, it uses the all-call address operation.



Comm  
Mode

In the illustration, 3767 "A" is a group master, and 3767 "B" is a subordinate terminal. The 3767 "C" is also a group master, and 3767s "D" and "E" are subordinates. The 3767 "A" is the all-call master of subordinate terminals "B", "C", "D", and "E". When the host wants to send the same data to 3767 "C", "D", and "E", it sends to group master "C". If "C" is not ready, the host does not transmit. If "C" is ready, the host sends the data to group master "C", and terminals "C", "D", and "E" receive the data at the same time. (If either "D" or "E" is not ready, it cannot receive the data.)

The same applies to the all-call address operation when 3767 "A" is the group master and "B", "C", "D", and "E" are the subordinate terminals.

When your system uses group or all-call addressing, you should know whether your terminal is a master or a subordinate terminal.

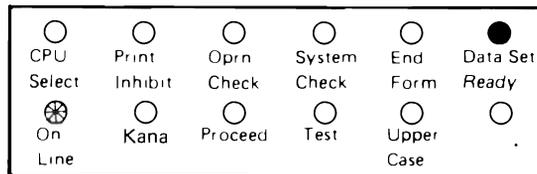
A. If your terminal is a group or all-call master terminal, the operating procedure is the same as for an individual address terminal. A master terminal is responsible for not

only its own operation, but also the operation of its subordinate terminals:

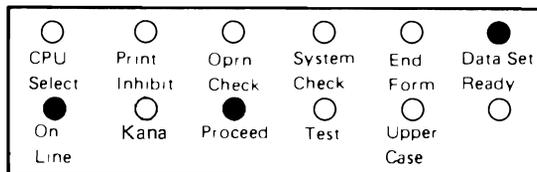
- a. You must know which terminals belong to your group as subordinates. Inform the operators of those terminals if your terminal is not working.
  - b. Your terminal must be ready, or the subordinate terminals cannot receive the data, even if they are ready.
  - c. The master and the subordinate terminals receive group data at the same time.
- B. If your terminal is a subordinate terminal, the operating procedure is the same as for an individual address terminal. The following points are necessary for proper operation:
- a. You must know which terminal in your group is the master terminal. Contact the operator of the master terminal if you believe you are not receiving group messages. If your terminal is ready but the master terminal is not ready, you cannot receive group data.
  - b. All terminals in the group receive group data at same time.

*Example of 2740-1 Transmit Operation (Station Control)*

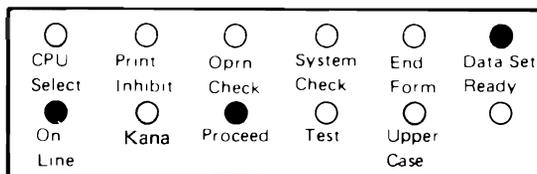
Standing by.



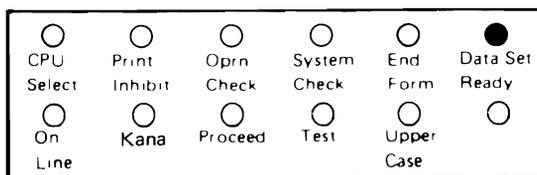
Press SYS REQ key.



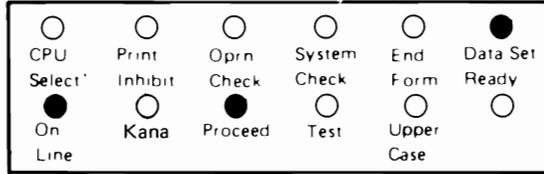
Wait for the Proceed light to come on, then key in data.



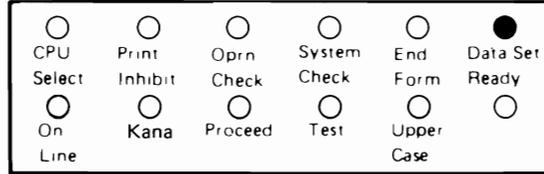
Press EOB key.



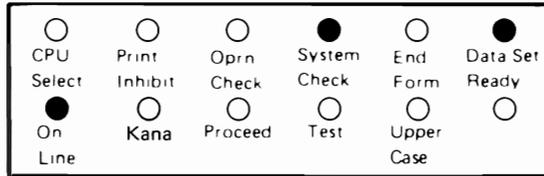
Wait for the Proceed light to come on, then key in data.



Press EOB key.



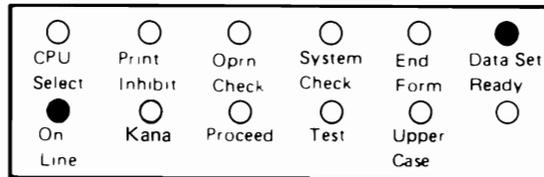
When data transmission was not successful.



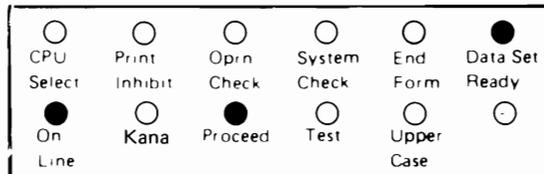
1 6 6

Comm Mode

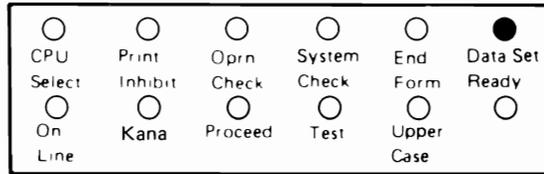
Press RESET key.



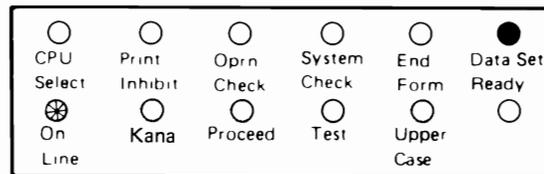
Wait for the Proceed light to come on, then key in data.  
After keying in the data, press the EOB key.



When the Proceed light comes on again, press the EOM key.

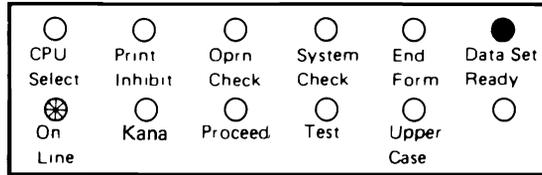


Standing by.

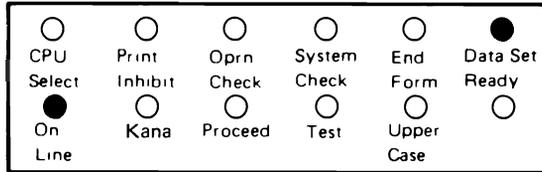


Example of 2740-1 Receive Operation (Station Control)

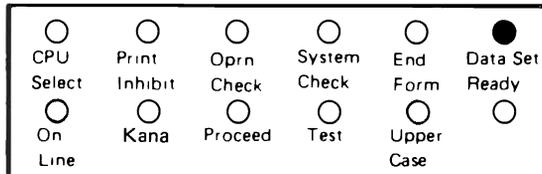
Standing by.



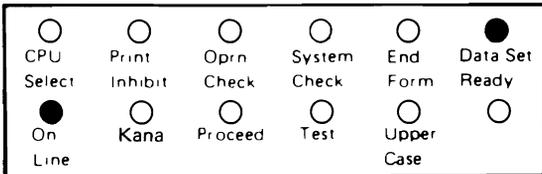
Receive data.



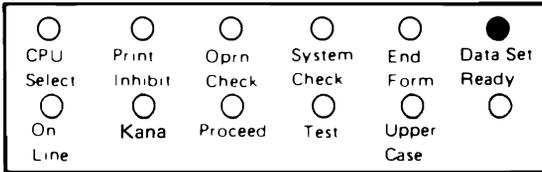
At the end of data block.



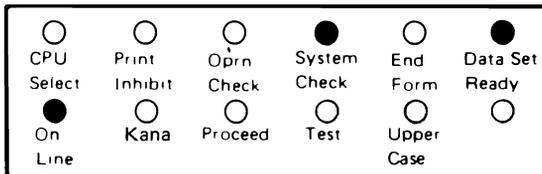
Receive data.



At the end of data block.

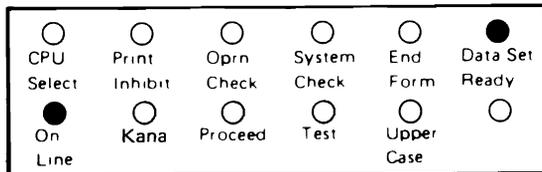


When receiving was not successful.

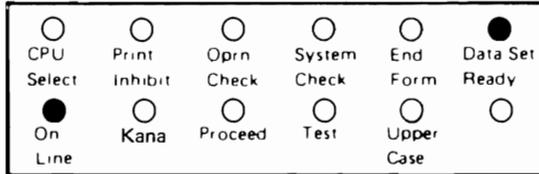


1	6	4
1	6	5
1	6	7

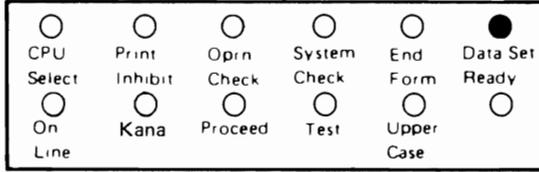
Press RESET key.



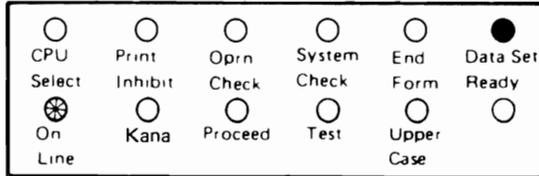
Receive data.



At the end of data



Standing by.



Comm  
Mode



•  
•

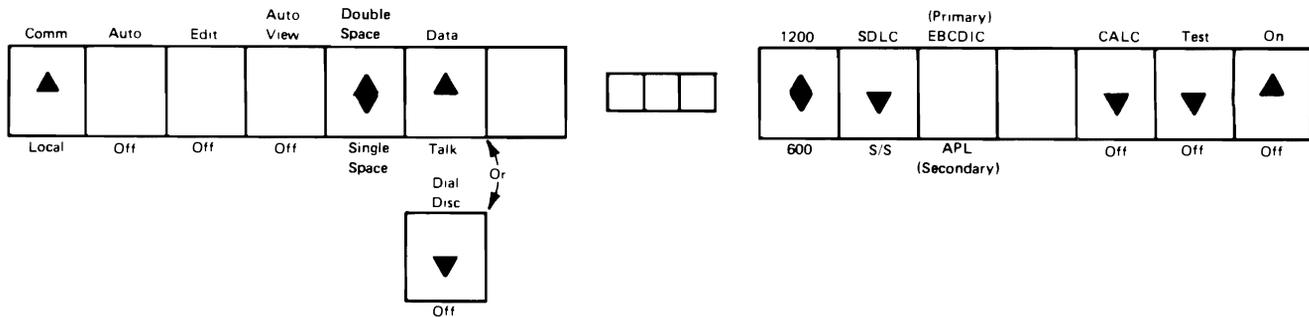


•  
•



## 2740-2 LINE CONTROL OPERATION

The switch settings for 2740-2 line control are:



Unlike the IBM 2740, the 3767 does not stop printing at the right margin.

Keyed-in or received characters are not printed if the host has signalled print inhibit. If printing is inhibited, the Print Inhibit light comes on and the printer spaces for each character. Functions such as return or tab occur normally. The print inhibit condition is terminated by a signal from the host. If the condition is not terminated during communicate operation, printing is inhibited even after the terminal is changed to local mode. (To reset the condition in local mode, you must turn the terminal power off.)

The 15-second keystroke time-out can be avoided by any one of the following:

Pressing a character or function key, pressing the ATTN key, performing a buffer edit function, or pressing the PRINT VIEW key.

(To deliberately prevent a timeout, use the Print View key.)

If data is not transmitted successfully, the terminal automatically retransmits the same data at the request of the host program. If final retransmission is unsuccessful, the transmit operation ends; the System Check light comes on, the ANR displays 166, and the alarm sounds. See *IBM 3767 Models 1, 2, and 3 Communication Terminal Problem Determination Guide*, for instructions.

When the buffer is full, the Proceed light goes off and you cannot store any more data. You must transmit the data in the buffer by pressing the SYS REQ key to continue the key-in operation.

If your terminal is not ready to receive or is in local mode when the host requests it to receive; the On Line light flashes, the audible alarm sounds, and the CPU Select light comes on.

The CPU Select light goes off when you have switched to communicate mode and readied the terminal to receive and have indicated this condition to the host.

### Transmit Operation

After you have made basic preparations for a communicate operation, the On Line light flashes when the host requests data from the terminal.

*Note:* Data may be stored, and edited, in either local or communicate mode for transmission in communicate mode.

1. Press the ATTN key (same as ENTER on 2740-2). The Proceed light comes on and the alarm sounds.
2. Key in the data to be transmitted. The keyed-in data is stored in the buffer. Key in data at least every 15 seconds after the Proceed light comes on. Otherwise, the Proceed light goes off, and the transmit operation ends. (This condition is called a time-out.) After a time-out, start the transmit operation over again from the beginning of the block if you had data stored in the buffer.

The audible alarm sounds with each character keyed into the last ten positions of the buffer. If the buffer becomes full, the Proceed light goes off and no more data is stored.

3. Edit the data before transmission if required. (You can edit with the Edit/Off switch in either position.)
4. To transmit the data you have keyed in, press the SYS REQ key. The Proceed light goes off. The On Line light stays on while the data is being sent to the host. Then the light will flash if the host is ready to continue.
5. Repeat steps 1 through 4 until all data is transmitted.

Comm  
Mode

## Receive Operation

During a terminal receive operation, the host controls whether it will address an individual terminal or use an all-call or group address.

### *Individual Terminal Address Receive Operation*

After a data block has been received, the On Line light goes off. If the data has been received correctly, your terminal will print the data. When additional data is received, the On Line light comes on again. The On Line light flickers to indicate the last data block has been received.

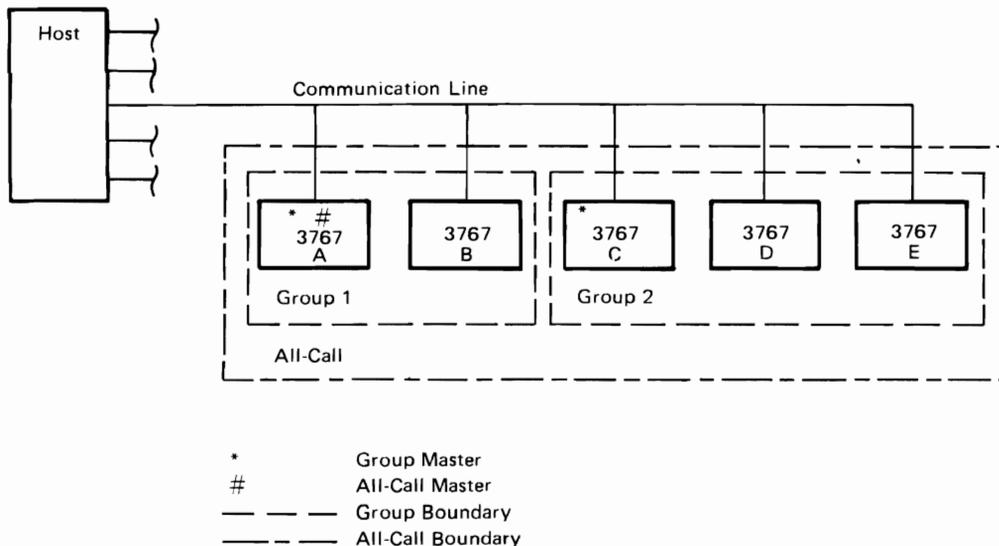
### *Group Address and All-call Address Receive Operations*

When the host wants to send data to a specific terminal, it uses the individual terminal address operation. When it wants to send the same data to a group of terminals at the same time, it uses the group address operation. When it wants to send the same data to all terminals on a communication line at the same time, it uses the all-call address operation.

In the illustration, 3767 "A" is a group master, and 3767 "B" is a subordinate terminal. The 3767 "C" is also a group master, and 3767s "D" and "E" are subordinates. The 3767 "A" is the all-call master of subordinate terminals "B", "C", "D", and "E". When the host wants to send the same data to 3767 "C", "D", and "E", it sends to group master "C". If "C" is not ready, the host does not transmit. If "C" is ready, the host sends the data to group master "C", and terminals "C", "D", and "E" receive the data at the same time. (If either "D" or "E" is not ready, it cannot receive the data.)

The same applies to the all-call address operation when a 3767 "A" is the group master and "B", "C", "D", and "E" are the subordinate terminals.

When your system uses group or all-call addressing, you should know whether your terminal is a master or a subordinate terminal.



A. If your terminal is a group or all-call master terminal, the operating procedure is the same as for an individual address terminal. A master terminal is responsible for not only its own operation, but also for the operation of its subordinate terminals:

- a. You must know which terminals belong to your group as subordinates. Inform the operators of those terminals if your terminal is not working.
- b. Your terminal must be ready, or the subordinate terminals cannot receive the data, even if they are ready.
- c. The master and the subordinate terminals receive group data at the same time.

B. If your terminal is a subordinate terminal, the operating procedure is the same as for an individual address terminal. The following points are necessary for proper operation:

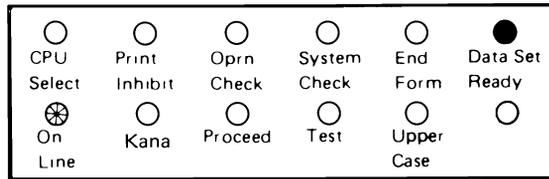
- a. You must know which terminal in your group is the master terminal. Contact the operator of the master terminal if you believe you are not receiving group messages.

If your terminal is ready but the master terminal is not ready, you cannot receive group data.

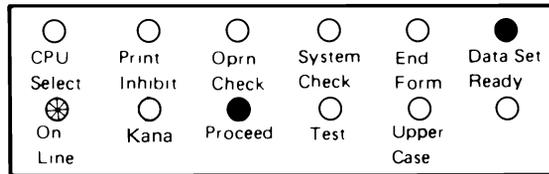
- b. All terminals in the group receive group data at same time.

*Example of 2740-2 Transmit Operation*

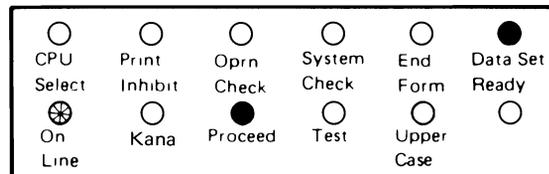
Standing by.



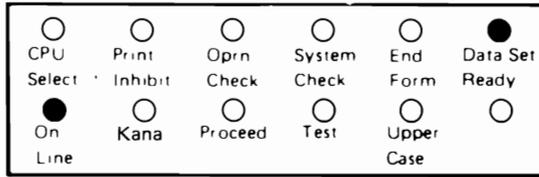
Press ATTN key.



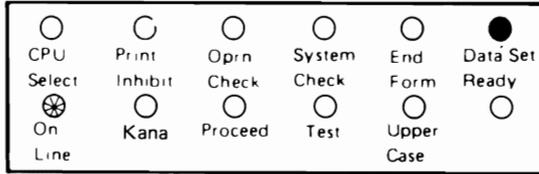
Key in data. (Data is stored in the buffer.)



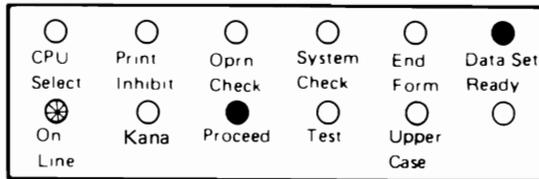
Press SYS REQ key. (Data is transmitted.)



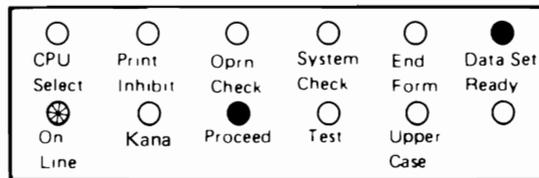
Standing by.



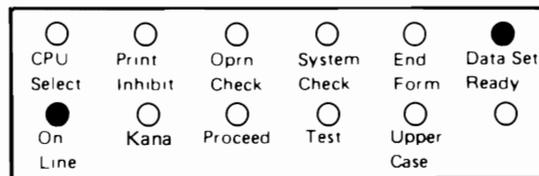
Press ATTN key.



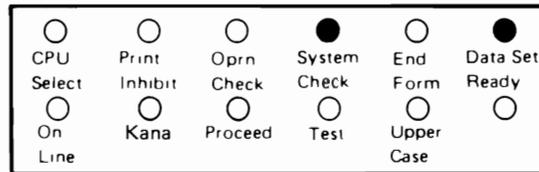
Key in data. (Data is stored in the buffer.)



Press SYS REQ key.

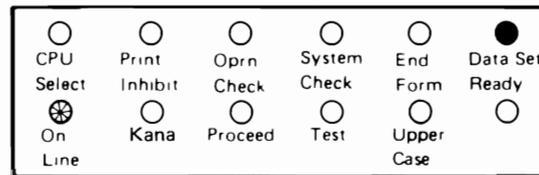


Data transmission was not successful.

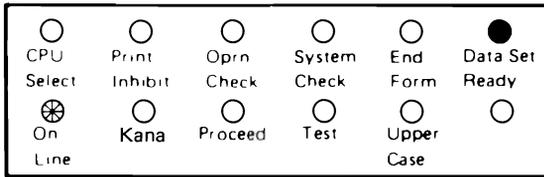


1 6 6

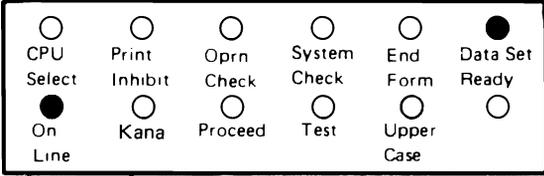
Press RESET key.



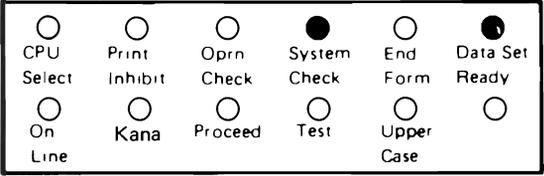
Standing by.



Press SYS REQ key and attempt to send the contents of the buffer again.



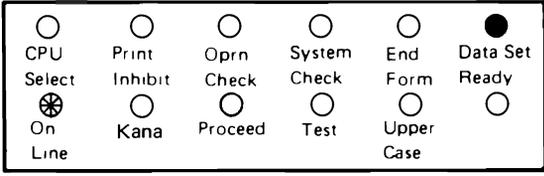
Data transmission was not successful.



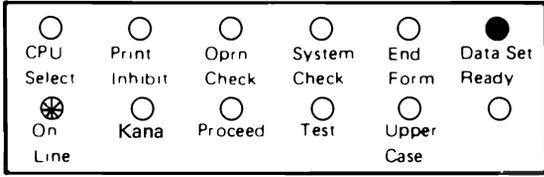
1 6 6

Comm Mode

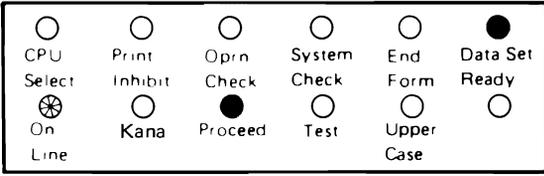
Press RESET key.



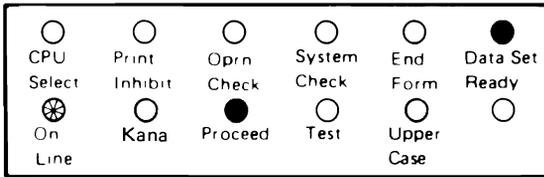
Standing by.



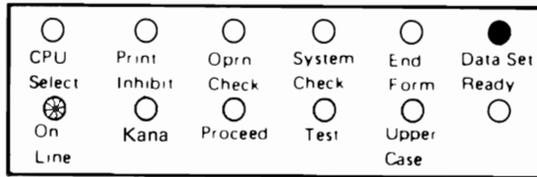
Press ATTN key.



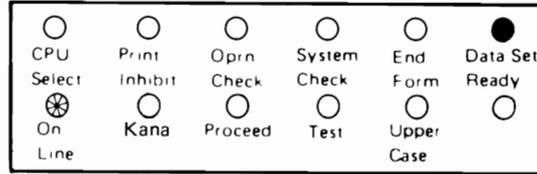
Key in data. (Data is stored in the buffer.)



If the key-in interval exceeds 15 seconds (time out), the keyed-in data is lost.

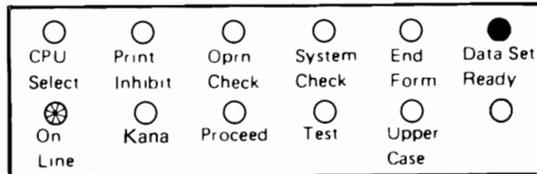


Standing by.

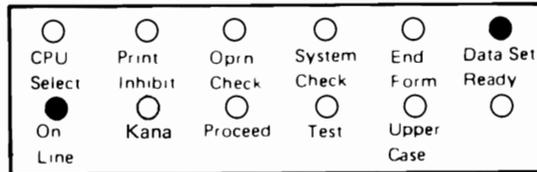


*Example of 2740-2 Receive Operation*

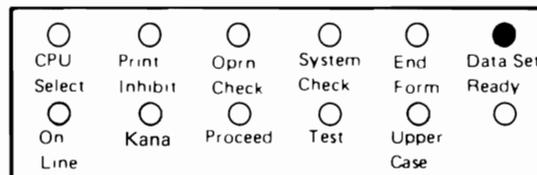
Standing by.



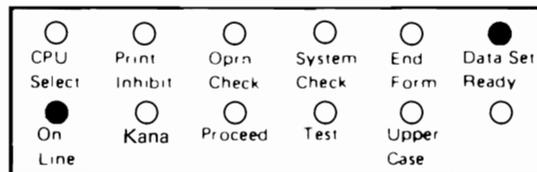
Receive data.



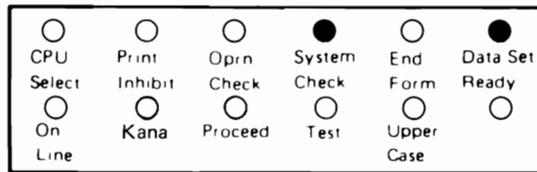
At the end of the data block.



Receive data.



The data receiving is not successful.  
(The data will not be printed.)



1	6	4
1	6	5
1	6	7

The host re-sends the data automatically. (The number of times is determined by the host.)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
CPU	Print	Oprn	System	End	Data Set
Select	Inhibit	Check	Check	Form	Ready
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On	Kana	Proceed	Test	Upper	
Line				Case	

1	6	4
1	6	5
1	6	7

The data was not successfully received after all attempts.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
CPU	Print	Oprn	System	End	Data Set
Select	Inhibit	Check	Check	Form	Ready
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On	Kana	Proceed	Test	Upper	
Line				Case	

1	6	4
1	6	5
1	6	7

Standing by.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
CPU	Print	Oprn	System	End	Data Set
Select	Inhibit	Check	Check	Form	Ready
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On	Kana	Proceed	Test	Upper	
Line				Case	

1	6	4
1	6	5
1	6	7

Press RESET key.

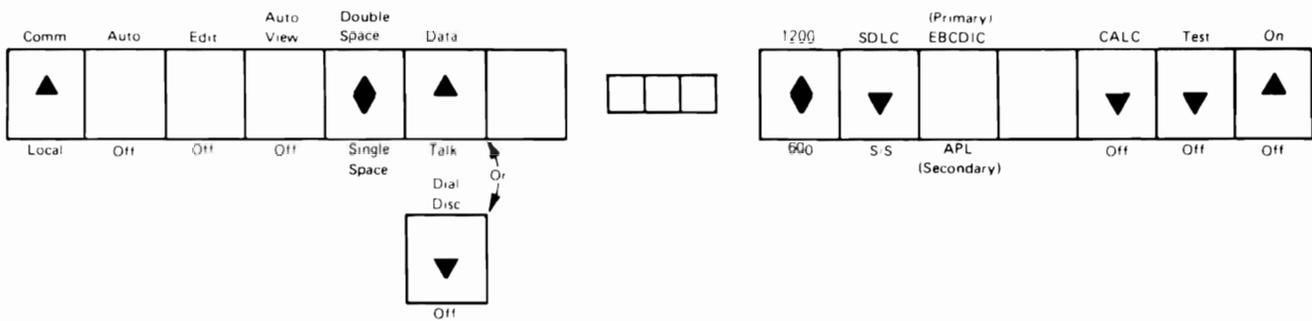
<input type="radio"/>	<input checked="" type="radio"/>				
CPU	Print	Oprn	System	End	Data Set
Select	Inhibit	Check	Check	Form	Ready
<input type="radio"/>					
On	Kana	Proceed	Test	Upper	
Line				Case	

Comm Mode



## 2741 LINE CONTROL OPERATION

The switch settings for 2741 Line Control are:



Unlike the IBM 2741, the 3767 does not stop printing at the right margin.

Pressing the INDEX key advances the platen a single line or double line depending on the Double Space/Single Space switch setting.

If your terminal is in local or calculate mode and if the Data Set Ready light (not Normal Signal light) is on, when the host requests it to receive, the audible alarm sounds.

Keyed-in or received characters are not printed if the host has signaled print inhibit. If printing is inhibited, the Print Inhibit light comes on and the printer spaces for each character. Functions such as return or tab occur normally. The print inhibit condition is terminated by the host. If the condition is not terminated during communicate operation, printing is inhibited even after the terminal is changed to local mode. (To reset the condition in local mode, you must turn the terminal power off.)

If your terminal has the Interrupt feature:

- a. The host can stop your transmit operation and change the terminal to receive status at any time.
- b. Press the ATTN key when you want to stop a receive operation. (The receive operation ends in the normal manner, but do not rely on the printed data.) Your terminal goes into transmit status, and the Proceed light comes on, then you can key in data, or end the operation.

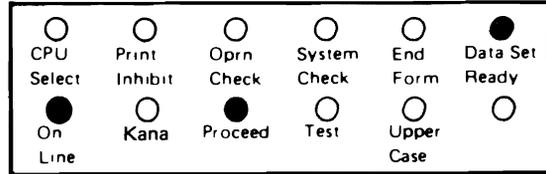
After you have made the basic preparations for communicate mode operation, transmit data as follows.

1. After the Proceed light comes on, key in the data to be transmitted. Data is transmitted as it is keyed in.
2. Press the Return key (or the ATTN key) after you finish keying in each line. The Proceed light goes off.
3. Your terminal may receive return data from the host.
4. Repeat steps 1, 2, and 3 until all data is transmitted.

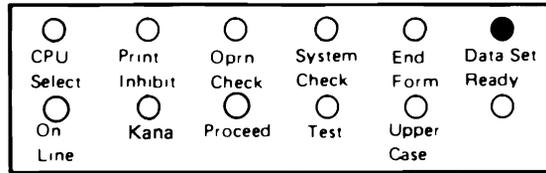
**Comm  
Mode**

*Example of 2741 (with Interrupt) Operation*

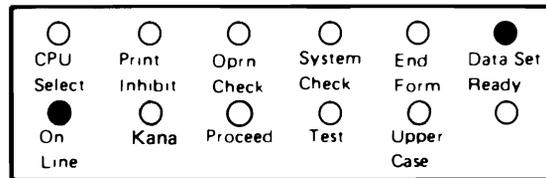
Turn Comm/Local switch to Comm. Standing By



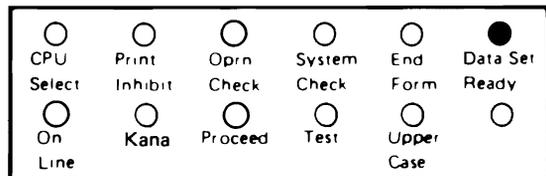
Press ATTN (or Return) key.



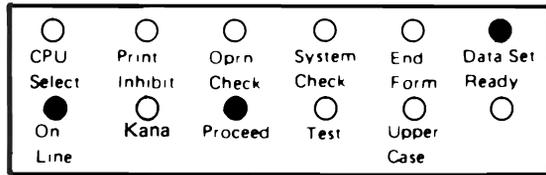
Receive data.



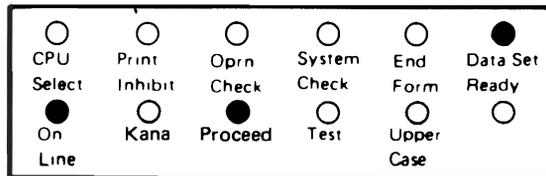
At the end of the data block.



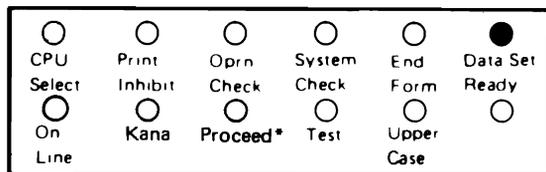
Standing by.



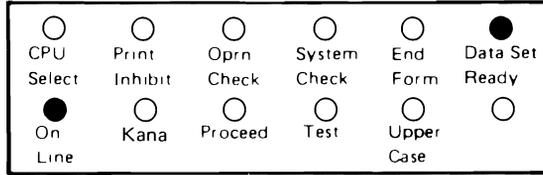
Key in data.



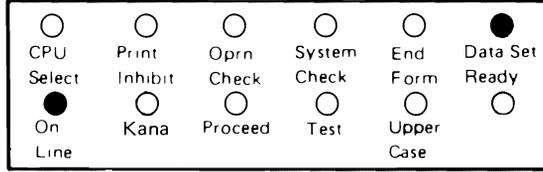
Press Return (or ATTN) key at the end of the data block.



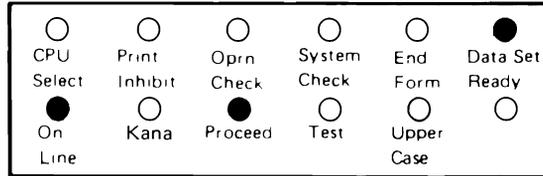
Receive data.



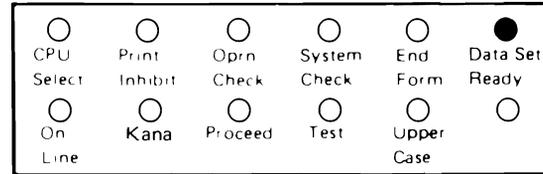
Press ATTN key, if urgent data must be sent.  
(Receive interrupt)



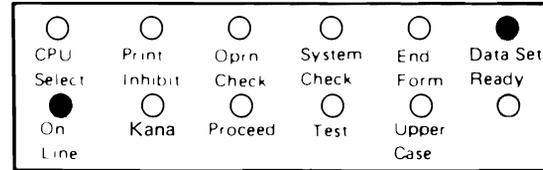
Wait for the Proceed light to come on,  
then key in data.



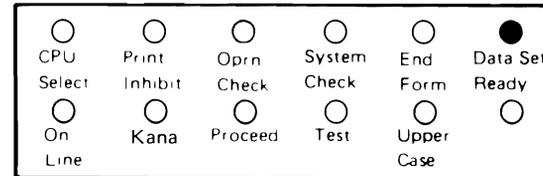
Press Return (or ATTN) key at the end of the  
data block.



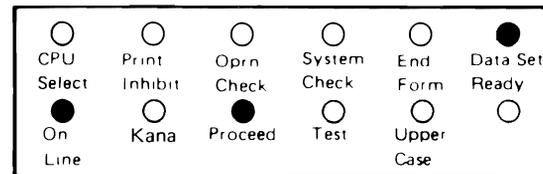
Receive data.



At the end of the data block.



Standing by.



Comm  
Mode



.  
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,  
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## TERMINATING COMMUNICATE OPERATIONS

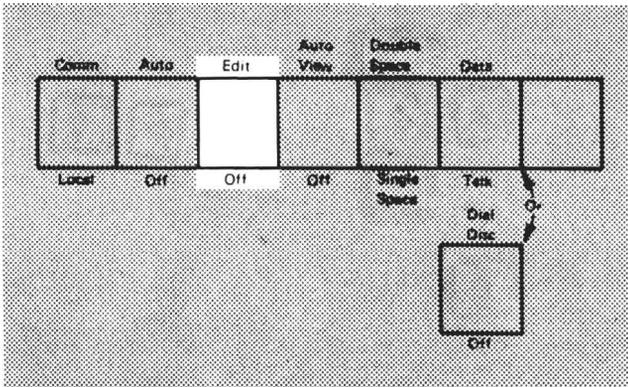
To end transmit or receive operations, do the following:

1. Verify that the terminal is idle.
2. If this is a switched network operation, disconnect the communication line. Place the handset on the cradle.
3. Turn the Comm/Local Switch to Local.
4. Turn the On/Off switch off.
5. Lock the security keylock and remove the key (if the feature is installed).

## CORRECTION OF DATA STORED IN THE 3767 BUFFER

The storing of keyed-in data in the buffer allows you to correct character(s) you have keyed in, before transmitting or printing the stored data. (If your machine has an Edit/Off switch, you can print out the buffer contents to verify the accuracy of stored data.)

The extent of, and procedures for, correcting data in the buffer depend upon what function keys are on your machine and (for SDLC control) the settings of the Edit/Off and Auto/Off switches.



### Conditions for Stored Data Correction and Editing

Correction of stored data is possible only when the 3767 is operating under 2740-2 S/S control or under SDLC control. Under SDLC control, correction of data for transmission must be done in communicate mode. Under 2740-2 S/S control, editing can be done regardless of the setting of the Edit/Off switch; stored data edited in local mode can be transmitted in communicate mode.

If your 3767 does not have the Edit/Off switch, only single-line (line currently being keyed) correction can be done. If the Edit/Off switch is present and set to Edit, correction of stored data is referred to as "editing".

When you are storing data in the buffer, any character that is entered in the last ten positions causes the audible alarm to sound. When the buffer is full, the Proceed light goes off and no more data is stored (2740-2 S/S control or SDLC control with Edit/Off set to Edit).

If an edited line is shorter than the old line, following data is shifted ahead. If the edited line becomes longer than the original line, all following data is shifted back to

make room. If editing causes a character to go into the last ten buffer positions, the alarm does *not* sound; if editing causes overflow from the buffer by shifting, the overflow data is lost. (A possible overflow will be apparent when you advance the editing action to the end of the stored data by pressing PRINT BUFFR. Any data originally keyed in that does not appear in the printout has been lost.)

Once stored in the buffer, a Return or Form Feed code cannot be removed or replaced with other data. If you want to delete or insert one or more complete lines (thus involving Return and/or Form Feed codes), you must clear the buffer and key in the entire data block again.

After an edit operation, data transmission begins at the first buffer position and continues to the position where edit action stopped. Edit action is advanced, to include all of the stored data that is to be transmitted, by printing (Print Buffr, Print Line, or Print Char).

*Caution:* The Auto/Off switch *must be set to Off* when printing from the buffer.

*Note:* The audible alarm will sound if the stored line is longer than 128 characters; it may sound at the end of the last line printed. Neither of these conditions requires any operator action.

An edit or correction operation starts when you press one of the following keys:

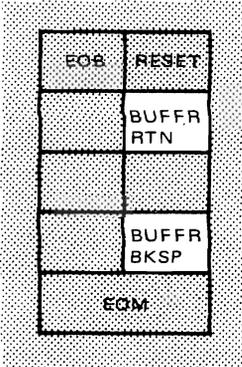
BUFFR RTN  
BUFFR LINE RTN  
BUFFR BKSP

The edit or correction operation ends when one of the following occurs:

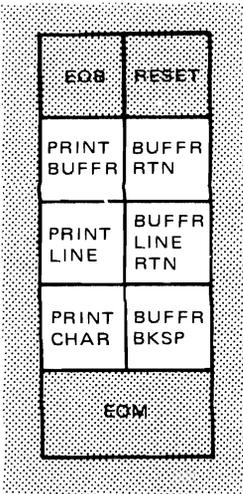
- The editing action reaches the last position that was originally keyed in.
- The EOB or EOM key is pressed in communicate mode. (The contents of the buffer through the position of the last edit action is transmitted.)
- The Return or FORM FEED key is pressed with the Auto/Off switch set to Auto (SDLC only). (The contents of the buffer through the position of the last edit action is transmitted.)

Edit

If your 3767 does not have an Edit/Off switch, and is operating under SDLC control, read the description for "Basic SDLC Data Correction". You have the following function keys (on the right of the keyboard) for stored data correction.



If your 3767 has the Edit/Off switch, read the description for "Buffered SDLC and 2740-2". You have the following function keys (on the right of the keyboard) for editing.



*Note:* Under SDLC control and with the Auto/Off switch set to Auto, only the current line may be edited.

*Caution:* The CANCEL key deletes data stored in the buffer. Its use for this purpose is not recommended because data already sent to the host under SDLC control may be lost.

### Conditions for Transmitting Stored Data

Stored data that has been transmitted cannot be corrected or edited. See charts below:

3767	Control	Operator Action to Transmit
Machines with no Edit/Off switch	SDLC	EOB key, EOM key; Return key or FORM FEED key if Auto/Off switch is in Auto position
	S/S	Not controlled by operator

3767	Control	Operator Action to Transmit	
Machines with the Edit/Off switch	SDLC	Auto/Off-Off	Auto/Off-On
		EOB key, EOM key, automatically every 256 characters if the Edit/Off switch is Off.	Return key, EOB key, EOM key, FORM FEED key
2740-2 S/S		SYS REQ key	SYS REQ key

### Clearing Buffer Contents

The data stored in the buffer, together with the secure data, clears when you do one of the following:

1. Press the BUFFR RTN and EOB or EOM keys in communicate mode. Stored data is lost and a block with no data in it is transmitted.
2. Press the EOB or EOM key in communicate mode (SDLC only). (Cleared after transmission to the host is complete.)
3. Press the Return or FORM FEED key in communicate mode, while the Auto/Off switch is in Auto position (SDLC only). (Cleared after transmission to the host is complete.)
4. Press the SYS REQ key in communicate mode (SDLC only). (You may be required to log off and then log on again.)
5. Turn the Comm/Local switch to Comm (SDLC only).
6. Turn the Edit/Off switch to off, then to Edit while the terminal is in local mode (SDLC only).
7. Press the CNCL key. (The data entered since the last EOM may be cleared, even a part of the data that is already transmitted.) (SDLC only).

### Basic SDLC Data Correction

If your 3767 does not have an Edit/Off switch, or if the Auto/Off switch is set to Auto, correction is limited to the current line. Reenter the entire line if the error is at the beginning of the line; use the BUFFR BKSP key to correct an error made near the end of the line.

#### Reentering the Line

1. Turn the Comm/Local switch to Comm.
2. Press the BUFFR RTN key. The print head returns to the left margin, one line feed takes place and the ANR displays the value of the left margin.
3. Key in the line again. Complete the line in the normal manner.

### Correction of the Current Line

#### A. Using vertical line on the cut forms guide:

Assume that you want to key in "The morning air is refreshing".

After you key in "air", you find that "mb" was keyed in instead of "ng" in "morning".

1. Locate the error (underlined).

The mornmb air

2. Turn the Auto View/Off switch to Auto View.

3. Repeatedly press the BUFFR BKSP key until the vertical line on the cut form guide aligns with the first error character.

The mornmb air

4. Advance the form by rotating the platen knob (to avoid overprinting).

5. Key in the correct data to the end of the line (ng air is refreshing).

The mornmb air

ng air is refreshing

6. The buffer now contains the correct data.

The morning air is refreshing.

#### B. Using ANR:

Assume that you want to key in "The morning air is refreshing". After you key in "air", you find that "mb" was keyed in instead of "ng" in "morning". (Print positions 17 and 18 are incorrect; you can see this on the scale marked on the canopy.)

1. Locate the error (underlined).

The mornmb air

2. Repeatedly press the BUFFR BKSP key until the ANR displays the first error position.



3. Advance the form by rotating the platen knob (to avoid overprinting).

4. Key in the correct data to the end of the line; (ng air is refreshing.)

The mornmb air

ng air is refreshing.

5. The buffer now contains the correct data.

The morning air is refreshing.

Edit

## Buffered SDLC and 2740-2

Under SDLC control, you must turn the Edit/Off switch to Edit to do an edit operation. If your terminal is operating under 2740-2 S/S control, you can edit at any time (the Edit/Off switch position does not affect the edit operation). If you want to do a keyboard-to-printer edit under 2740-2 S/S control, you must press the ATTN key (the alarm sounds). The Auto/Off switch must be set at Off whenever you use the PRINT BUFFER, PRINT LINE, or PRINT CHARACTER key.

*Note:* Under SDLC control, if you are keying continuous data with the Auto/Off and Edit/Off switches set Off, a full buffer is automatically transmitted (see "Conditions for Transmitting Stored Data"). Correct only the current line under these conditions, using only the BUFFER BACKSPACE key. Continue keying from the corrected position.

### Correction of the Current Line

#### A. Using vertical line on the cut forms guide:

Assume that you want to key in "I am not what I was ten years ago". After you key in "years", you find that "rm" was keyed in instead of "en" in "ten".

1. Locate the error (underlined).

```
I am not what I was trm years ago.
```

2. Turn the Auto View/Off switch to Auto View.
3. Repeatedly press the BUFFER BACKSPACE key until the vertical line on the cut form guide aligns with the first error character.

```
I am not what I wa t|rm years ago.
```

(If you backspace too far, repeatedly press (or press and hold) the PRINT CHARACTER key until the vertical line aligns with that print position.)

4. Advance the form by rotating the platen knob (to avoid overprinting).

5. Key in only the corrections. (en)

```
I am not what I was trm years  
en
```

6. Press the PRINT LINE key.

```
I am not what I was trm yea s  
en years
```

7. Continue keying in (ago.).

```
I am not what I was trm years  
en years ago.
```

8. The buffer now contains correct data.

```
I am not what I was ten years ago.
```

#### B. Using ANR:

Assume that you want to key in "I am not what I was ten years ago". After you key in "years", you find that "rm" was keyed in instead of "en" in "ten". (Print positions 25 and 26 are incorrect; you can see this on the scale marked on the canopy.)

1. Locate the error (underlined).

```
I am not what I was trm years
```

2. Repeatedly press the BUFFER BACKSPACE key until the ANR displays the first error position.



(If you backspace too far, press the PRINT CHARACTER key until ANR shows the desired value.)

3. Advance the form by rotating the platen knob (to avoid overprinting).

4. Key in only the corrections. (en)

```
I am not what I was trm years  
en
```

5. Press the PRINT LINE key.

```
I am not what I was trm years  
en years
```

6. Continue keying in (ago.).

```
I am not what I was trm yea s  
en years ago.
```

7. The buffer now contains correct data.

```
I am not what I was ten years ago.
```

### Correction of a Previous Line

Assume that you want to key in:

```
Any device capable of sending  
and receiving information over  
a communication channel.  
Data terminal equipment for
```

After you key in "for", you find the errors shown in step 1. (Each line starts at the left margin.)

1. Locate the errors:(underlined)

```
Any device capable of sending  
and receiving information over  
a communication channel, and a  
Data terminal equipment for
```

2. Press the BUFFR RTN key.

```
Any device capable of sending  
and receiving information over  
a communication channel, and a  
Data terminal equipment for
```

3. Press the PRT LINE key for each line before the first error line (once in this example).
4. Repeatedly press (or press and hold) the PRINT CHAR key until you come to the first error position of this line.

```
and receive
```

5. Key in only the corrections (ng).

```
a receiving
```

6. Press the PRINT LINE key if you made a character-for-character correction (as in this example). (If you add or delete data, you must key in the remainder of the line and press the Return key.)

```
and receiving information over
```

7. Repeatedly press (or press and hold) the PRINT CHAR key until you come to the next error.

```
and receiving information over  
a communication channel
```

8. Key in only the corrections (.).

```
and receiving information over  
a communication channel.
```

9. Press the Return key. This indicates the end of editing for the line. (The 3767 deletes data until it comes to the Return code that was originally stored; in this example, "and a" is deleted.)

```
and receiving information over  
a communication channel.
```

10. Press the PRINT BUFFR (or PRINT LINE) key to advance the edit action to the end of the data originally stored.

```
and receiving information over  
a communication channel.  
Data terminal equipment for
```

11. The buffer now contains correct data; continue the operation.

```
Any device capable of sending  
and receiving information over  
a communication channel.  
Data terminal equipment for
```

### Reentering All Data

1. Press the BUFFR RTN key.

The print head returns to the left margin, one line feed takes place, and the ANR displays the value of the left margin.

2. Key in the data from the beginning of the data block.

### Printing the Current Line

If you want to print out the contents of the current line:

1. Press the BUFFR LINE RTN key. The carrier returns to the left margin and a line feed takes place.
2. Press the PRINT LINE key. The contents of the current buffer line are printed. (Instead of pressing the PRINT LINE key, you can press (and hold) the PRINT CHAR key.)

### Printing From the Middle of the Buffer

If you want to print buffer contents starting in the middle:

1. Count backward from the current line until you reach the line where you want to start printing.
2. Press the BUFFR LINE RTN key as many times as you counted in step 1. The carrier returns to the left margin and a line feed takes place.
3. Press the PRINT BUFFR key. The contents of the buffer, from the beginning of the selected line to the last position keyed in, are printed.

Instead of pressing the PRINT BUFFR key in step 3, you may press the PRINT LINE key or press and hold the PRINT CHAR key.

### Printing the Entire Buffer

When you want to print the entire buffer, do the following:

1. Press the BUFFR RTN key. The carrier returns to the left margin and a line feed takes place.
2. Press the PRINT BUFFR key. The contents of the buffer are printed from the beginning.

Edit

## MAGNETIC STRIPE READER (MSR) OPERATION

The Magnetic Stripe Reader (MSR) reads data from a magnetic stripe card in either communicate or local mode when the terminal is operating under SDLC line control. The data read is treated the same as keyed-in data. When the data read has an operator identification, the Print Inhibit light turns on and the data is secured and not printed. Although, printing is inhibited, the print head moves one space each character. In communicate mode, printing remains inhibited until the EOB or EOM key is pressed. (After printing has been inhibited, any data keyed in before pressing the EOB or EOM key is also not printed.)

*Note:* Printing can also be inhibited by a signal from the host. When this happens, the condition continues until the terminal receives a restoring signal from the host. In local mode, print inhibit is removed automatically after the card is read.

Secured data in the buffer cannot be edited. If editing of secured data is attempted, the Oprn Check light turns on and the audible alarm sounds. The RESET key must be pressed to reset the condition. If the MSR data exceeds the maximum print position (print position 132 at power on time, or another print position signaled by the host), printing (or spacing) does not take place. The data is discarded, the ANR displays a number that is one greater than the maximum print position, and the Oprn Check light turns on. The RESET key must be pressed to continue. The ANR will display the print position before the card was read.

If the buffer full condition results from reading the magnetic stripe card, the audible alarm sounds, the Oprn Check light turns on, and the Proceed light turns off. The data from the magnetic stripe card is discarded. The RESET key must be pressed, and an operation to clear enough space in the buffer (such as pressing the EOB key to transmit the buffer data) should be performed to reread the card. If the data from the magnetic stripe card exceeds the maximum print position (line overflow) and the buffer becomes full simultaneously, the former condition will be indicated on the terminal.

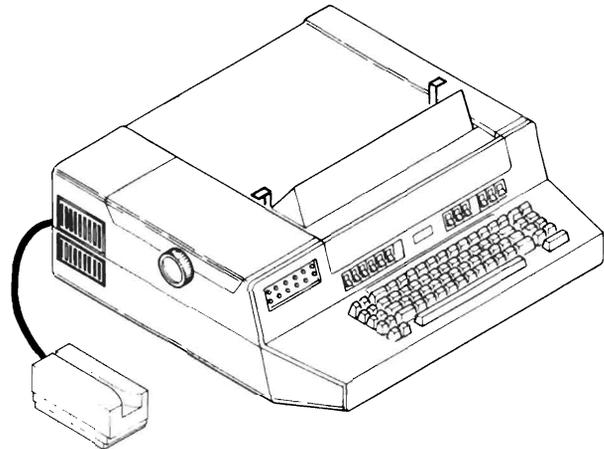
The Proceed light must be on to read a card. You must pass the card through the slot in the MSR at a constant speed, maintaining the bottom of the card in even contact with the bottom of the slot. Move the card at about the speed you would wipe off the blackboard with your hand (between 5 and 40 inches per second, or between 127 and 1016 millimeters per second). If the card is moved either too slowly or too quickly, the reading operation may be unsuccessful.

To transmit data from the MSR when the terminal is in communicate mode:

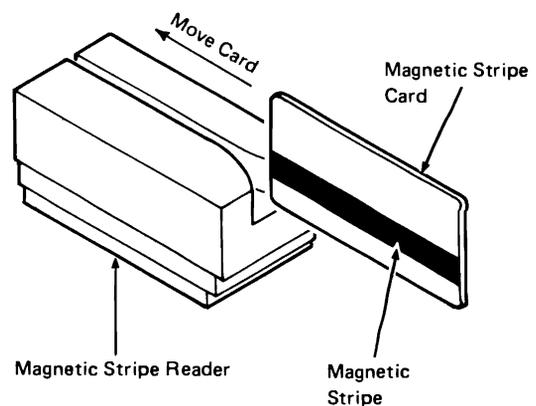
1. Check that the Proceed light is on.
2. Read a card. (Printing or spacing occurs.)
3. Press the EOB or EOM key to transmit data.

If the reading is unsuccessful, the Oprn Check light turns on. Try reading the card again. (Do not try to read a scratched or cracked card.) If this does not correct the problem, refer to Section K in the *IBM 3767 Problem Determination Guide (GA18-2012)*.

*Note:* Do not attempt to read a magnetic stripe card while performing a New Line operation; wait until the New Line operation has been completed.



Magnetic Stripe Reader



### KEYBOARD-TO-PRINTER OPERATION

Keyboard-to-printer operation in local mode causes the keyed-in data to be printed but not transmitted.

*Note:* If the CPU Select light starts blinking during local mode operation, the 3767 is receiving a request from the host location to operate with the terminal in communicate mode.

If the Print Inhibit light is on, keyed-in characters are not printed but the printer spaces. Keyed-in functions (such as Return and tabs) are performed. The light stays on if the terminal is changed from communicate to local mode before the condition is restored by the host. To turn off the light, you should turn off the power.

If the terminal is operating as a 2740-2, the data stored in the buffer in local mode can be transmitted in communicate mode.

Take the following steps to operate the terminal as a keyboard printer. If the power is already on, start at step 3.

1. Unlock the security keylock.
2. Turn the On/Off switch On.
3. Turn the Comm/Local switch to Local.
4. Insert paper in the printer in the appropriate manner (see Chapter 3).
5. Turn the Calc/Off switch Off (if your terminal has one).
6. Set the Double Space/Single Space switch to the desired position.
7. Set the Auto View/Off switch to the desired position.
8. Set the Edit/Off switch to the desired position.
9. Set the left and right margins and tab stops as required.
10. Set Vertical Forms Control numbers as required (if your terminal has the VFC feature—SDLC only).
11. Key in the data.

See “Forms Control”, Chapter 3, for margin setting, tab setting, and vertical forms control operations; see “Operating the Terminal in Communicate Mode”, Chapter 4, for correction of data stored in the buffer.

### CALCULATION

This feature allows use of the terminal as a desk-top electronic printing calculator. A terminal equipped with this feature has a Calc/Off switch.

The results are printed out but cannot be transmitted directly to the host. Likewise, data from the host cannot be used directly as input for a calculation. See *Appendix B* for operating instructions and *Appendix C* for descriptions of operating controls.



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This chapter describes the tests you should perform in determining if the IBM 3767 Communication Terminal or the host processor is working properly. The *Problem Determination Guide* (Order No. GA18-2012) should be used in connection with this chapter.

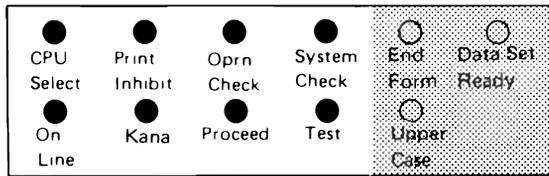
**DIAGNOSTIC TESTS**

**Basic Assurance Test (BAT)**

This test checks the basic operation of the terminal. It runs automatically (for about 12 seconds) when power is turned on, as follows.

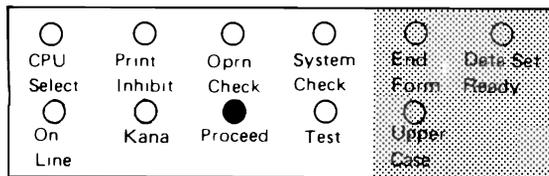
1. Turn the Calc/Off switch (if present) to Off.
2. Turn the Comm/Local switch to Local.
3. If the security keylock is present, unlock it.
4. Turn the On/Off switch to On.

ANR displays 1 8 8 and the following lights come on for about two seconds, then go off:



*Note:* The Oprn Check light will come on during the test; ignore it. Also, ignore the status of the lights in the shaded area.

If the test ends successfully, the status of the lights is as follows:



The ANR displays     1 and the print head is at the leftmost position.

After a basic assurance test, the terminal is set as follows:

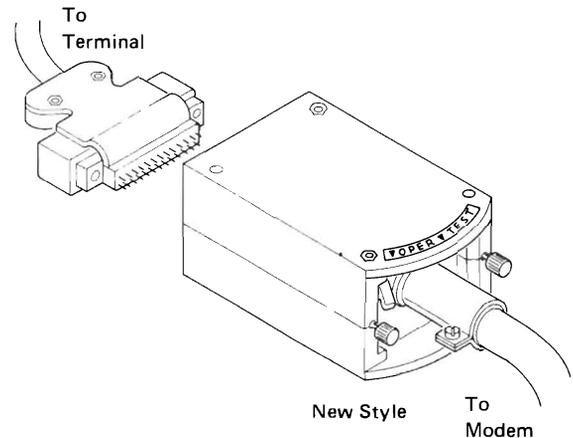
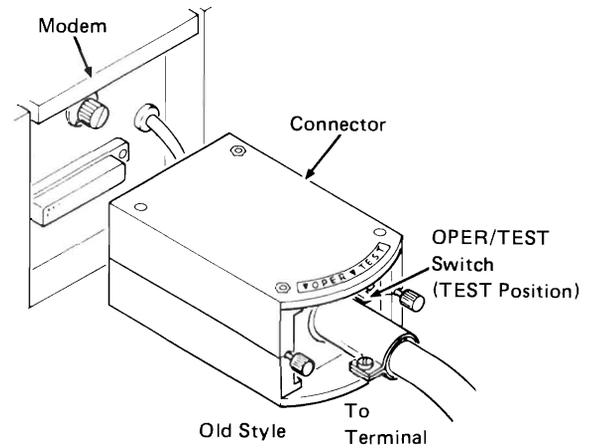
- Left Margin: Print Position 1
- Right Margin: Print Position 132
- Maximum Print Position: Print Position 132
- All horizontal tabs and VFC settings are cleared.

If the test does not end as described, record the status of the lights (on or off) on the Operator's Trouble Report form, and call the terminal service representative.

**Offline Test**

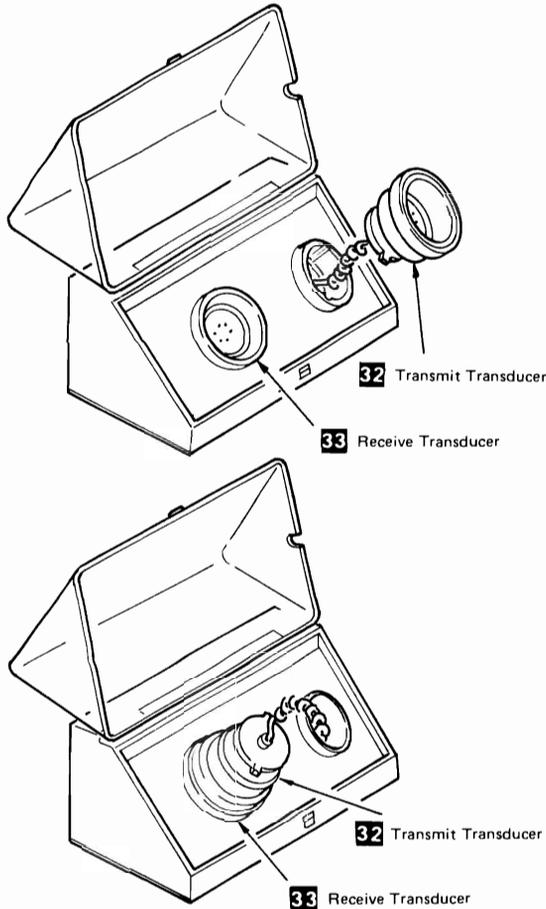
This test checks the operation of the electronic circuits and the printer. It also checks the operation of the integrated modem, if your terminal has one. The test runs as follows:

1. If the terminal has an external modem, turn the OPER/TEST switch on the modem cable connector to the TEST position.



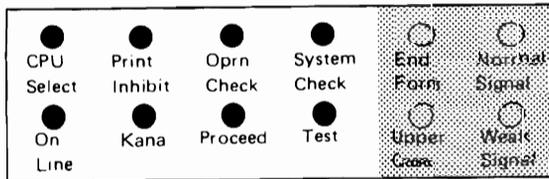
PDT

2. If your terminal has an acoustic coupler, the transducers of the coupler must be joined.
  - a. Raise and hold the plastic cover.
  - b. Remove the transmit transducer **32** by pressing down, rotating counterclockwise, and pulling it up. Then place it face to face on the receive transducer **33**.



- c. Slowly lower the cover to rest on the transducer. (The cover will be in a half-closed position, and will hold the transducer in place during the test.)
3. Be sure the printer has enough suitable paper for a 75-line printout (shown on next page).
4. Turn the Comm/Local switch to Local.
5. Turn the Calc/Off switch (if present) to Off.
6. Press and release the Test/Off switch.

- a. The ANR displays **1 8 8** and the following lights come on while the Test switch is pressed.



Note: Ignore the lights in the shaded area.

- b. The audible alarm sounds and the following information prints out when the Test switch is released; if you are filling out a Trouble Report form, attach the printout to it.
- c. After the main section prints, there is a pause of about 20 seconds. Then, the last two or four lines print and printing stops; the left-hand eight lights turn on again briefly.

Note: These printouts are examples only. The contents may vary each time, but the total number and arrangement of lines should be the same as either one of the examples when the Offline Test has been completed.

```

0000 02 7A 80 8F 0F EC 00 01 0E 38 08 04 B9 FB BE 0C
0010 00 09 A2 00 00 15 04 04 03 44 00 02 00 F2 20 20
0020 00 07 C7 08 R1 00 00 80 FE DC 00 00 FF 28 F0 FD 1C
0030 02 10 F5 10 05 21 F0 80 00 00 80 20 00 20 01 00
0040 00 00 00 00 80 00 00 03 00 00 00 1F 00 0F F8 C2 68
0050 00 88 00 00 01 04 08 F1 1A 04 EF 00 00 00 0E 65
0060 C1 3A 44 C1 C0 C9 C1 40 08 F1 00 08 01 A2 00 00
0070 00 00 7F 7F 00 7E C1 00 C1 C1 00 00 00 00 00 00
0080 00 00 04 3A 4F FF FF C1 00 00 80 00 00 0A 11
0090 00 20 D8 FF 00 D8 00 FC 00 00 FF C0 C1 00 07 6C
00A0 00 04 00 00 00 00 F3 00 FF 00 00 50 00 00 0E 9C
00B0 00 C0 20 01 02 67 00 02 00 35 28 7E 00 02 21 01
00C0 00 00 20 41 40 20 08 00 42 11 00 00 40 EF 14
00D0 00 00 00 00 00 00 00 R1 00 00 00 00 00 00 00 00
00E0 34 00 R1 00 0F 00 69 00 41 00 B9 F0 E7 FB B9 9E
00F0 00 00 90 00 00 00 02 00 01 01 00 00 07 B6 7F FF
0100 04 00 05 00 04 00 04 00 04 00 00 83 30 00 00 00
0110 00 80 00 00 00 00 00 00 38 0F 5F 2F EC 04 00 FB F6
0120 FF FF FF FF 00 01 00 00 00 00 00 00 00 00 00 00
0130 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0140 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0150 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0160 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0170 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0180 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0190 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
01A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
01B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 40 00
01C0 00 00 00 03 00 00 00 00 00 00 00 00 00 00 00 00
01D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
01E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
01F0 00 80 F2 80 00 00 23 FE DC 00 80 F5 24 FC 08 1F
0200 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0210 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0220 00 00 00 00 00 00 00 00 00 00 00 00 01 01 01 01
0230 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0240 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0250 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0260 00 00 00 7F 01 00 F0 02 00 01 DC 61 00 00 10 00
0270 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0280 01 7C 21 00 00 10 01 07 33 00 E5 01 00 70 2A 00
0290 02 7A 80 8F 08 90 80 01 0E 38 08 04 B9 FB BE 0C
02A0 00 09 30 00 00 A0 04 03 4C 00 02 00 F3 20 C1
02B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
02C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
02D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
02E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
02F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0300 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0310 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0320 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0330 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0340 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0350 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0360 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0370 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0380 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0390 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
03A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
03B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
03C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
03D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
03E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
03F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
03C0 06 54 03 DC 56 FA B2 D4 E4 C5 15 FE 27 76 B6 54
03D0 7F 7F 8F 27 14 84 29 F3 00 00 AA 5E A7 54 BE DD
03E0 58 5C 8F 67 C9 71 F6 CA 02 C7 BC CC 47 EB 84 51
03F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

```

```

0123456789ABCDEF GHI JKLMNOPQRSTU VWXYZ abcdefghijklmnopqr
stuvwxyz.(+*)?-/,%& ;'=<>'*!$%#
0123456789ABCDEF GHI JKLMNOPQRSTU VWXYZ abcdefghijklmnopqr
stuvwxyz.(+*)?-/,%& ;'=<>'*!$%#

```



IBM 3767 Operator's Trouble Report

*Instructions:* If a problem occurs, describe it briefly below. Then run the offline test before turning power off. Have the test printout and this Trouble Report ready for the terminal service representative. Fill out all applicable blanks below.

Unit Identification \_\_\_\_\_

Date and Time \_\_\_\_\_

Reported By \_\_\_\_\_

Trouble Description: \_\_\_\_\_

- |                                                                                                                          |                                                               |
|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <input type="checkbox"/> Form feeding improperly                                                                         | <input type="checkbox"/> Printer error                        |
| <input type="checkbox"/> Ribbon bunching or jamming                                                                      | <input type="checkbox"/> Noticed smoke, heat, or unusual odor |
| <input type="checkbox"/> Other (Describe below; also describe what tests you ran and whether successful or unsuccessful) | <input type="checkbox"/> Print head stays at right margin     |
|                                                                                                                          | <input type="checkbox"/> Cooling fan not blowing air          |

Test Results and Other Troubles: \_\_\_\_\_

*Lights:* Check the lights that were on when the trouble occurred and after each test that you performed. Also write in the ANR number that was displayed.

Lights that were on (check)	After Assurance Tests			
	When Trouble Occurred	BAT	Offline	Online
CPU Select				
Print Inhibit				
Oprn Check				
System Check				
End Form				
Data Set Ready				
On Line				
Kana				
Proceed				
Test				
Upper Case				
Weak Signal				
ANR				

*Switches:* Check the positions of the switches when trouble occurred.

Comm	Auto	Edit	Auto View	Double Space	Data
-----	-----	-----	-----	-----	-----
Local	Off	Off	Off	Single Space	Talk

2400	SDLC	EBCDIC	Calc	Test	On
1200	-----	-----	-----	-----	-----
600	S/S	APL	Off	Off	Off
1200					

### LIGHTS

1. CPU Select  
The host addressed the terminal when the terminal was not ready to receive.
2. Print Inhibit  
This light indicates that data will not be printed but the print head will move one space for each character of the data. Functions such as Form Feed, Tab, Return, and Space are performed normally. The print inhibit function is provided for security of operator identification.
3. Oprn Check (Operation Check)  
This light indicates that an operational error has occurred. Operator action, as explained in Chapter 6, is required to correct the situation.
4. System Check  
This light indicates that a system error, transmission error or machine check has occurred and an ANR error indication is displayed. Refer to Chapter 6 for recovery procedures.
5. End Form (End of Form)  
This light indicates that the printer has run out of tractor-fed forms. This light comes on ten lines before the end of the last form; the print head automatically moves to the leftmost position and printing cannot take place. The forms must be replenished and a Form Ready operation performed before printing on tractor-fed forms can resume.
6. Data Set Ready (or Normal Signal with acoustic coupler)  
The Data Set Ready light indicates that the modem is operational. If you have a 3767 with an acoustic coupler, the Normal Signal light replaces the Data Set Ready light on the panel shown in this manual. In acoustic coupler operation, Normal Signal light on while in receive mode (Proceed light off) indicates that the receive signal level is high enough to operate.
7. On Line  
This light indicates that the terminal is exchanging signals with the host.
8. Kana (Japan Only)  
This light indicates that the keyboard is in either the Katakana or Kana symbol shift. This light is present with the Katakana keyboard.
9. Proceed  
This light indicates that the operator can enter data from the keyboard or from the magnetic stripe reader.
10. Test  
This light indicates that a built-in test is running.
11. Upper Case  
This light indicates that the keyboard is in uppercase.
12. Weak Signal (Acoustic Coupler only)  
When in receive mode (Proceed light off), this light indicates that the received signal level might be too low to operate. Re-seat the handset firmly if this light comes on. If necessary, remove the handset from the coupler and redial the connection.
13. ANR (Alphanumeric Readout)  
This indicator normally shows the printer's next print position when the keyboard is unlocked. Under error conditions (when the System Check light is on), it shows an error code (ANR greater than 133). When no error exists and the keyboard is locked, the ANR is blank.

### SWITCHES

1. Comm/Local (Communicate/Local)  
This switch changes the terminal from communicate mode to local mode or vice versa.
2. Auto/Off  
With this switch in the Off position, pressing the EOB or EOM key causes transmission of data stored in the buffer. With this switch in the Auto position, pressing the Return key or FORM FEED key also causes transmission of stored data.
3. Edit/Off  
This switch enables editing of data in the entire buffer, before it is transmitted or before it is printed. The switch is effective only when the terminal is under SDLC control. (When the terminal is under 2740-2 S/S control, text editing can be performed regardless of the setting of this switch.) When this switch is on, the EOB and EOM keys control data transmission (also Return and FORM FEED if the Auto/Off switch is set to Auto). When this switch and the Auto/Off switch are off, data transmission occurs automatically every 256 characters.

#### 4. Auto View/Off

When the Auto View/Off switch is in the Auto View position and during a keyboard data entry operation: The print head automatically moves eight print positions to the right so that the last character printed is visible. The vertical line on the plastic shield is aligned with the next print position. Pressing the PRINT VIEW key causes the print head to move eight print positions to the right of the last character of the longest line among the last three lines printed.

When this switch is in the Auto View position and during a receive operation: The print head moves eight print positions to the right of the last character of the longest line among the last three lines printed after a data block is received.

When this switch is in the Off position and during a keyboard data entry operation: The print head does not move to the right after printing. Pressing the PRINT VIEW key causes the print head to move eight print positions to the right from the last character printed. Pressing the PRINT VIEW key again causes the print head to move eight print positions to the right of the last character of the longest line among the last three lines printed. When this switch is in the Off position pressing the TAB, Return, Backspace, or Space (when pressed more than three times) key causes the print head to move eight print positions to the right from the last character printed.

When this switch is in the Off position and during a receive operation: The print head moves eight print positions to the right of the last character of the last line after a data block is received.

The print view functions only through print position 124.

#### 5. Double Space/Single Space

When this switch is in the Double Space position, the printer feeds two lines (3 print lines per inch); when Single Space, it feeds one line (6 print lines per inch). (1 inch = 2.54 centimeters)

#### 6. Data/Talk (WT Countries except Germany)

With this switch in the Data position, the terminal can perform communicate operations. With this switch in the Talk position, the terminal cannot perform communicate operations, but you can talk to host personnel through an attached telephone set.

#### 6. Dial Disc/Off (Germany only)

When this switch is momentarily set to the Dial Disc position, it causes the terminal to disconnect a switched network connection.

#### 8. Line Speed

This switch selects a communication line speed, and is labeled either 2400/1200 or 1200/600. When labeled 2400/1200, it selects either the 2400 or 1200 bps (bits per second); when labeled 1200/600, it selects either the 1200 or 600 bps line speed. 600/1200 bps operation is for countries other than USA.

*Note:* Operator intervention is also required at the host if this switch setting is changed.

#### 9. SDLC/SS

This switch must be set before power is turned on. It selects the line control desired, either SDLC or start-stop (2740-1, 2740-2, or 2741).

#### 10. Keyboard Character Set Selection

This switch enables the user of 3767 (that has the alternate character set feature installed) to change character set by setting the switch to the desired position as follows. (Refer to "Keyboard" in Chapter 1.)

<i>Primary</i>	<i>Secondary</i>
Corresp	APL
Corresp	EBCDIC
EBCDIC	APL
EBCDIC	Corresp
EBCDIC	Mono

#### 12. Calc/Off (Calculation)

When this switch is set to the Calc position while the Comm/Local switch is in Local, the terminal can be used as a desk calculator.

#### 13. Test/Off

When this switch is momentarily set to the Test position and released, the 3767 runs an automatic, built-in test. For details, refer to Chapter 6.

#### 14. On/Off

This switch, when set On, supplies power to the 3767. If the security key is on, the basic assurance test runs just after power is supplied to the terminal.

#### 16. Security Keylock

This switch, when locked, prevents the 3767 from working. It must be unlocked before power on.

### KEYS

#### 1. FORM FEED (VFC Feature)

This key works only under SDLC control. Pressing this key causes the paper to advance to the starting line of the next page. During a transmit operation (with the Auto/Off switch on Auto), this key also performs the function of the EOM key.

2. VERT TAB (Vertical Tab, VFC Feature)

Pressing this key causes the paper to advance to the line where the next vertical tab stop was set. If no vertical tab was set, a line feed occurs. If this key is pressed when the form is past the last tab stop position, the Operation Check light comes on and you must press the RESET key to continue.

4. CNCL (Cancel)

SDLC—Pressing this key while the terminal is in the receive state stops the printing of received data. If it is pressed while the terminal is in the transmit state, this key clears the buffer, transmission ends, and a cancel message is sent. When a cancel message is sent, data already sent to the host may be lost.

2740-2—Clears the buffer when operating in enter status. Resets the mode when there is no polling in progress. (The functions are the same as those of the IBM 2740-2 RESET key.)

5. CODE

This key is used to activate the following dual-purpose keys as function keys.

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

To activate these function keys, press and hold the CODE key; then press and release the function key.

6. INDEX

Pressing this key causes the form to advance one line (single space) or two lines (double space). In calculation mode, it also returns the print head to the left.

7. SYS REQ (System Request)

Pressing this key does the following:

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 send a signal indicating the desire to start transmission. (The function is the same as the IBM 2740-1 BID key.)

2740-1 Station Control—Causes the terminal to wait for a signal from the host allowing transmission of data. (The function is the same as the IBM 2740-1 BID key.)

2740-2—Causes the buffer contents to be transmitted. (The function is the same as the IBM 2740-2 BID key.)

9. ATTN (Attention)

Pressing this key does the following:

SDLC—Causes a special signal to be transmitted.

The use of this information depends upon the customer's application.

2740-2—Enable the keyboard-initiated data to enter the buffer. (The function is the same as the IBM 2740-2 ENTER key.)

2741—Causes transmission of the ending signal (when the terminal is in transmit status) or an interrupt signal (when the terminal is in receive status).

10. PRINT VIEW

This key provides the print view function on a character-by-character basis. Also see the Auto View/Off switch.

2740-1 with Station Control, 2740-2—Pressing this key restarts the intercharacter timeout count.

12. Form Load

This key must be used in conjunction with the CODE key. When this key is pressed, the print head moves to the physical left-most position so that a new form can be inserted. Printing is inhibited until the Form Ready function has been done.

13. Form Ready

This key must be used in conjunction with the CODE key. When this key is pressed after a form is inserted, the print head moves to the position it occupied before the Form Load key was pressed.

17. Vert Form Set (Vertical Form Set, VFC Feature)

This key must be used in conjunction with the CODE key. When it is pressed, the terminal clears all previous VFC data and enters vertical format setting status. This status ends when the Return key is pressed.

18. Tab Set

This key must be used in conjunction with the CODE key. When this key is pressed, a tab stop is set at the print position indicated by the ANR.

19. Tab Clear

This key must be used in conjunction with the CODE key. When this key is pressed, the tab stop at the print position indicated by the ANR is cleared.

20. Left Marg Set (Left Margin Set)

This key must be used in conjunction with the CODE key. When this key is pressed, the left margin is set at the print position indicated by the ANR. This automatically clears previous setting of the left margin.

21. **Right Marg Set (Right Margin Set)**  
 This key must be used in conjunction with the CODE key. When this key is pressed, the right margin is set at the print position indicated by the ANR. This automatically clears previous setting of the right margin.
24. **EOB (End of Block)**  
 Pressing this key does the following:
  - SDLC—Transmits the data stored in the buffer. The operator can continue to key in data as long as the Proceed light is on.
  - 2740-1—Transmits an LRC character and an end-of-data-block signal to the host. The operator can key in more data when the Proceed light is on. The function is the same as the IBM 2740-1 EOB key (2740-1).
25. **PRINT BUFFR (Print Buffer, Buffer Feature)**  
 Pressing this key causes the contents of the buffer, from the last position edited to the last position keyed-in, to be printed.
26. **PRINT LINE (Buffer Feature)**  
 Pressing this key causes the data in the buffer, from the last position edited to the New Line (NL) code character (stored when you press the Return key) or the last position keyed-in (last line), to be printed.
27. **PRINT CHAR (Print Character, Buffer Feature)**  
 Pressing this key causes the next buffer character to be printed. This is a typamatic key.
28. **EOM (End of Message)**  
 Pressing this key indicates to the host that transmission is complete. SDLC control causes the data stored in the buffer to be transmitted.
  - 2740-1—The function is the same as the IBM 2740-1 EOT key.
29. **RESET**  
 Pressing this key resets an error or irregular condition.
  - 2740-2—This key does not reset the buffer. It does not reset the mode when there is no polling on the line.
  - 2740-1—Performs the same functions as the IBM 2740-1 RST key.
30. **BUFFR RTN (Buffer Return)**  
 Pressing this key moves the key entry position back to the first position of the buffer. It also causes the printer to start a new line.
31. **BUFFR LINE RTN (Buffer Line Return, Buffer Feature)**  
 Pressing this key moves the key entry position back to the first position of the current line. It also causes the printer to start a new line. Pressing this key more than once causes the key entry position to move back to the beginning of successively earlier lines.
32. **BUFFR BKSP (Buffer Backspace)**  
 Pressing this key moves the key entry position and the print head backward one position at a time.

When the terminal is in calculate mode, the functions of the keys change accordingly (Figure B-1). A card illustrating the calculation nomenclature, with individual key decals, is provided with the feature. Use the card for easy reference, or attach the decals to the front surface of the keys.

*Note:* If your machine has the Alternate Character Set feature, select one of the decal cards to use for reference; the other set of decals can be attached to the keys.

The terminal can handle sixteen significant digits in the range of 9999999999999999 to 0.0000000000000001, positive and negative. A negative number is indicated by a hyphen (-) to the right of the number.

When the Calc/Off switch is set to Calc, the terminal automatically sets the decimal point between the fourth and fifth positions from the right, dividing the number into 12 integer digits and 4 fraction digits. The decimal point can be set at any other position before starting a calculation, and it will remain there until you change it or end calculate mode operation.

*Note:* There are some applications that require very high precision in calculating the root of a number. For those applications, it is recommended that the decimal be set for nine fraction digits—if the calculation is performed using the  $1/X$  and  $X^Y$  functions. See example 13 in this appendix.

If the decimal point is set to divide the number into 12 integer digits and 4 fraction digits, keying in a number of more than 12 integer digits will result in an 'Overflow' condition. This condition can also occur as a result of (or during

the process of) a calculation, regardless of positive or negative numbers. When it occurs during a calculation, the calculation stops and the message 'OVFLO' is printed.

With the decimal point set as above, if you key in more than 4 fraction digits, the rest are truncated. Truncation can occur as a result of (or during the process of) a calculation, regardless of positive or negative numbers; it does not stop the calculation, and no indication is printed.

*Note:* The INDEX key is used for print head return and line spacing when operating in Calculate Mode.

### PRINTING FORMAT

If the secondary character set is APL and the keyboard character set selection switch (Primary/Secondary switch in the diagram) is set to APL position while doing a calculate operation the printout is done in APL characters, which are not understandable. To avoid this situation, turn the switch to Primary position.

The printer prints calculation data between print positions 13 and 39.

The ANR always displays zero. Printing is done in the following format.

Code	Space	Digits	Sign
------	-------	--------	------

*Note:* Press the INDEX key one or more times before starting a calculation, to separate the printout from that of the previous calculation.

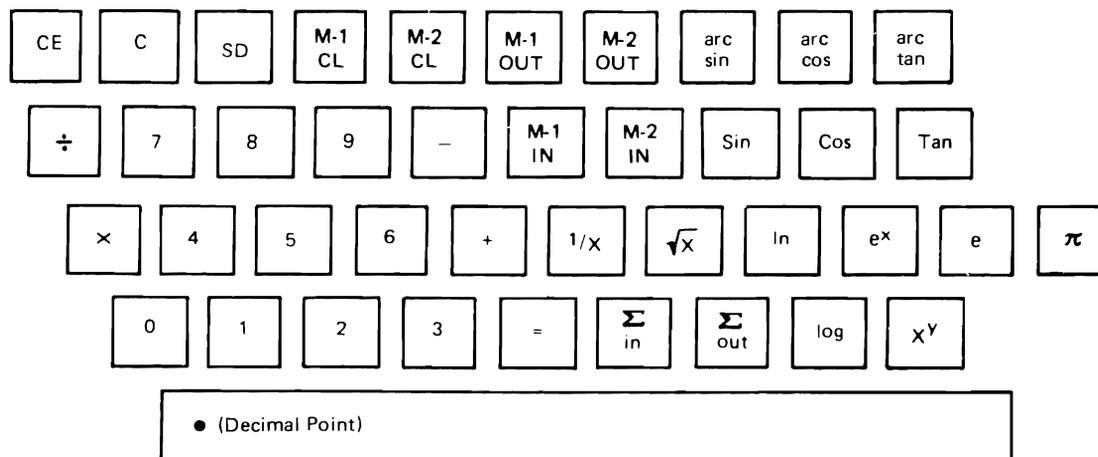


Figure B-1. Calculation Keyboard

## Code

Code consists of alphabetic, numeric, and special characters; it explains the meaning of the line, as follows:

*Note:* 'Accumulator' as used in the following explanations, means the place where calculation is done and where the results are stored.

ACOS	Arc cosine The number in the accumulator is used as a parameter of the calculation of arc cosine, and the result is stored in the accumulator.	EXP	e to the xth power The number in the accumulator is used as a parameter of the calculation of the power of e, and the result is stored in the accumulator.
ADD	Add The number following this code is added to the number in the accumulator, and the result is stored there.	INV	Inverse The number following this code is the result of a calculation of the reciprocal of the number that was in the accumulator.
ASIN	Arc Sine The number in the accumulator is used as a parameter of the calculation of arc sine, and the result is stored in the accumulator.	LN	Natural Logarithm The number in the accumulator is used as a parameter of the calculation of natural logarithm, and the result is stored in the accumulator.
ATAN	Arc Tangent The number in the accumulator is used as a parameter of the calculation of arc tangent, and the result is stored in the accumulator.	LOG	Common Logarithm The number in the accumulator is used as a parameter of the calculation of common logarithm, and the result is stored in the accumulator.
COS	Cosine The number in the accumulator is used as a parameter of the calculation of cosine, and the result is stored in the accumulator.	MEAN	Mean The number following this code is the result of a calculation of the mathematical mean value of the numbers that were keyed in with the $\Sigma$ in key.
DIV	Divide The number in the accumulator is divided by the number following this code, and the result is stored there. The nonsignificant remainder is ignored.	MLP	Multiply The number in the accumulator is multiplied by the number following this code, and the result is stored there.
EQU	Equal The number following this code is the result of a calculation, and is in the accumulator. This number is not cleared and stays there, until another operation is performed	M1-I	Memory 1-In The number following this code was added to the number in memory No. 1 and the result is stored there.
ERROR	Error This code is printed if the following invalid operations are attempted. <ol style="list-style-type: none"><li>Calculation of the square root of a negative number.</li><li>Calculation of the arc sine or arc cosine of an absolute value larger than 1.</li><li>Calculation of a natural logarithm or common logarithm of a value which is less than or equal to zero.</li><li>Calculation of any function, except <math>1/X</math> and <math>\sqrt{X}</math>, using more than 12 significant digits; for example, the natural logarithm of 12.0000000000 or e raised to the 0.100000000000 power will cause this code to be printed.</li></ol>	M2-I	Memory 2-In The number following this code was added to the number in memory No. 2 and the result is stored there.
		OVFLO	Overflow This code is printed when the integer part of the number keyed in (or that part of the result) exceeds the number of integer digits assigned to it by the current decimal point position. When this code is printed, the terminal stops the calculation and clears the contents of the accumulator.
		SDP	Set Decimal Point A line printed with this code shows where the decimal point is set and whether or not punctuation is specified. All 16 positions are symbolized by hyphens, and the decimal position is indicated by a period. When punctuation is requested, commas and spaces are inserted according to the rules.

SDV	Standard Deviation The number following this code is the result of a calculation of the mathematical standard deviation value of the numbers that were keyed in with the $\Sigma$ in key. Two calculating formulas are provided for standard deviation. Refer to the examples shown later.
SIN	Sine The number in the accumulator is used as a parameter of the calculation of sine, and the result is stored in the accumulator.
SQRT	Square Root The number following this code is the result of a calculation of the square root of the number that was in the accumulator.
SUB	Subtract The number following this code is subtracted from the number in the accumulator, and the result is stored there.
TAN	Tangent The number in the accumulator is used as a parameter of the calculation of tangent, and the result is stored in the accumulator.
X**Y	X to the Yth power The number in the accumulator before the first depression of the $X^Y$ key is used as a parameter of power. This parameter is applied to the number in the accumulator before the second depression of the $X^Y$ key. The result is stored in the accumulator.
ZAD	Zero and Add The contents of the accumulator are cleared, and the number following this code is entered.

#### Space

A space is used to separate the code from the digit.

#### Digit

A number consisting of 16 digits or less, and a decimal point, may be printed. Leading zeros are not printed. When you are using the punctuation function, commas (integer part) and spaces (fraction part) also appear in the print out.

#### Sign

When the number printed is negative, a - (hyphen) is printed immediately to the right of the number. When the number is positive, no sign is printed.

The range of input and output value for each function is shown in Figure B-2.

The expression of the parameter for a trigonometric calculation must be in a decimal degree form. A degree-minute-second form or a number expressed in radians cannot be used.

#### SETUP FOR CALCULATE OPERATION

Assuming that power is already on and paper is in the printer, do the following:

1. Set the Comm/Local switch to Local.
2. Set the Calc/Off switch to Calc. The Proceed light is on and the ANR displays zero at unit position. The keyboard shifts for a calculate operation, and a line feed takes place. The decimal point is automatically set between the fourth and fifth positions from the right.
3. Set the decimal point as required by the calculation, using the procedure described in the next topic, "Setting Decimal Point and Punctuation." (For very precise calculation of the root of a number using the  $1/X$  and  $X^Y$  keys, setting the decimal for nine fraction digits is recommended; see example 13 in this appendix.)
4. The Proceed light is on, and you can key in data.

*Note:* Wait until the results of the calculations have been completely printed before turning the Calc/Off switch to Off.

If the calculation does not complete successfully, do the following:

1. Turn the Calc/Off switch to Off.
2. Press the Reset key.
3. Turn the Calc/Off switch to Calc. A line feed takes place.
4. Set the decimal point, if required.
5. Key in the calculation from the beginning.

#### SETTING DECIMAL POINT AND PUNCTUATION

- A. Setting the Calc/Off switch to Calc, or pressing the SD key, automatically sets the decimal point between the fourth and fifth positions from the right.
- B. If you want seven fraction digits, for example, key in as follows:
  1. Press the C key.
  2. Press the 7 key.
  3. Press the SD key.
  4. Your terminal will print:

SDP -----



Name of Key	Function	Input		Output	
		Unit	Range	Unit	Precision *
SIN	Sin x	Degree	$ X  < \underset{=}{9999.9999}$	None	$\pm 1$ in 8th digit
COS	Cos x	Degree	$ X  < \underset{=}{9999.9999}$	None	$\pm 1$ in 8th digit
TAN	Tan x	Degree	$ X  < \underset{=}{9999.9999}$ $ X  < \underset{=}{(2n+1) \times 90 - 0.001}$ $ X  > \underset{=}{(2n+1) \times 90 + 0.001}$ $(n=0, 1, 2, 3, \dots)$ **	None	$\pm 1$ in 8th digit
arc Sin	$\text{Sin}^{-1} x$	None	$ X  < \underset{=}{1}$	Degree	$\pm 1$ in 8th digit
arc Cos	$\text{Cos}^{-1} x$	None	$ X  < \underset{=}{1}$	Degree	$\pm 1$ in 8th digit
arc Tan	$\text{Tan}^{-1} x$	None	$ X  < \underset{=}{9999.9999}$	Degree	$\pm 1$ in 8th digit
LOG	$\text{Log}_{10} x$	None	$0.00000001 < \underset{=}{x} < \underset{=}{99999999}$	None	$\pm 1$ in 8th digit
LN	$\text{Ln } x$	None	$0.00000001 < \underset{=}{x} < \underset{=}{99999999}$	None	$\pm 1$ in 8th digit
EXP	$e^x$	None	$-99999999 < \underset{=}{x} < \underset{=}{18.420680}$ ***	None	$\pm 1$ in 8th digit
$x^y$	$x^y$	None	Domain of X-Y plane that satisfies $0.00000001 < \underset{=}{x^y} < \underset{=}{99999999}$ $ y  < \underset{=}{50}$ ****	None	$\pm 1$ in 8th digit
1/X	1/X	None	$0.00000002 < \underset{=}{ X } < \underset{=}{9999999999999999}$	None	$\pm 1$ in last digit
$\sqrt{x}$	$\sqrt{x}$	None	$0 < \underset{=}{x} < \underset{=}{9999999999999999}$	None	$\pm 1$ in last digit

Note:

\* When the result does not have an integer part, the maximum error is  $\pm 1$  at the 8th position of the fraction part. When the result has an integer part, the maximum error is  $\pm 1$  at the 8th digit position from the first significant digit.

Examples: 0.00054897

1593.2847

Maximum error is  $\pm 1$  at this position.

\*\* For input data outside the specified range, the maximum relative error is  $1.4 \times 10^{-5}$ .

\*\*\* This specific value is due to the input limitation so that the output may not exceed 8 digits. If the range of X is  $-99999999 < X < -18.420680$ , the result will be zero.

\*\*\*\* This domain is shown on the right.

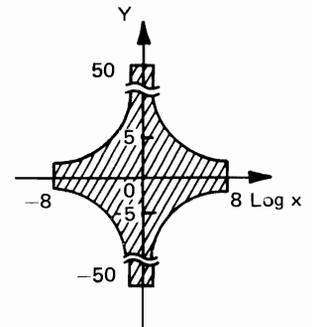


Figure B-2. Input Parameters and Output Precision

C. If you want seven fractional digits with punctuation, key in as follows:

1. Press the C key.
2. Press the 7 key.
3. Press the . (decimal point) key.
4. Press the SD key.
5. Your terminal will print:

SDP -----

The number 1932410.1072 would be printed:

1,932,410.107 2

*Note:* If you press the decimal point key more than once when keying in a number, only the first one is accepted. For example, the number keyed in as 4234.10.7.3 would be printed and calculated as: 4234.1073.

D. If you key in a number greater than 16 before pressing the SD key, an overflow condition occurs. 'OVFLO' is printed, and the number you keyed in is cleared.

### CONSTANT GENERATION KEYS

The e and π keys generate and supply a respective constant. The number of fraction digits depends on the setting of the decimal position. An example is shown below.

Key in	Printout	
C		
1		
5		
SD	SDP	-----
e	ZAD	2.71828182846
π	ZAD	3.14159265359

### EXAMPLES OF CALCULATION

To understand the method of the calculate operation, try the following examples. Then apply them to your own operation.

*Note:* If you key in an incorrect digit, press the CE (clear entry) key, and reenter the entire current number. You can also press the C (clear) key and start the entire calculation over. If you press the wrong function key, you must press the C key and start over.

In the following examples, the decimal point is assumed to be between the fourth and fifth digit position from the right, except in number 13; there, for very precise results, setting the decimal to nine fraction digits is recommended.

1.  $76 + 54.3 - 2.1 =$

Key in	Printout		Comment
C			
7			
6			
+	ZAD	76.	
5			
4			
.			
3			
-	ADD	54.3	
2			
.			
1			
=	SUB	2.1	
	EQU	128.2	Result

Calc

2.  $(123.2 + 0.4) \times 78 =$

Key in	Printout	Comment
C		
1		
2		
3		
.		
2		
+	ZAD	123.2
.		
4		
=	ADD	0.4
	EQU	123.6
x		
7		
8		
=	MLP	78.
	EQU	9640.8

Another method of calculation for this example:

Key in	Printout	Comment
C		
1		
2		
3		
.		
2		
+	ZAD	123.2
.		
4		
x	ADD	0.4
7		
8		
=	MLP	78.
	EQU	9640.8
		Result

3.  $\frac{24 \times 68.1}{35}$

Key in	Printout	Comment
C		
2		
4		
x	ZAD	24.
6		
8		
.		
1		
=	MLP	68.1
	EQU	1634.4
÷		
3		
5		
=	DIV	35.
	EQU	46.6971
		Result

Another method of calculation for this example:

Key in	Printout	Comment
C		
2		
4		
x	ZAD 24.	
6		
8		
.		
1		
÷	MLP 68.1	
3		
5		
=	DIV 35. EQU 46.6971	Result

4. 
$$\frac{(78 + 45) \times 12.3}{63}$$

Key in	Printout	Comment
C		
7		
8		
+	ZAD 78.	
4		
5		
x	ADD 45.	
1		
2		
.		
3		
÷	MLP 12.3	
6		
3		
=	DIV 63. EQU 24.0142	Result



5.  $12 \times 6.3 =$   
 $45 \div 6.3 =$   
 $78 \times 6.3 =$   
 ↑  
 constant

Key in	Printout	Comment
C		
M-1 CL		Clear memory No. 1
6		
.		
3		
M-1 IN	M1-I 6.3	
1		
2		
x	ZAD 12.	
M-1 OUT	MLP 6.3	
=	EQU 75.6	Result of $12 \times 6.3$
4		
5		
÷	ZAD 45.	
M-1 OUT	DIV 6.3	
=	EQU 7.1428	Result of $45 \div 6.3$
7		
8		
x	ZAD 78.	
M-1 OUT	MLP 6.3	
=	EQU 491.4	Result of $78 \times 6.3$

6.  $9 \times 23 =$   
 $-(4 \times 56) =$   
 $7 \times 89 =$   
 TOTAL =

Key in	Printout	Comment
C		
M-1 CL		Clear memory No. 1
9		
x	ZAD 9.	
2		
3		
M-1 IN	MLP 23.	
	M1-I 207.	Store result of $9 \times 23$ in memory No. 1
4		
x	ZAD 4.	
5		
6		
x	MLP 56.	
-		Change sign of $4 \times 56$
1		
M-1 IN	MLP 1.-	Add and store the result
	M1-I 224.-	of - ( $4 \times 56$ ) in memory No. 1

(continued on next page)

7				
x	ZAD		7.	
8				
9				
M-1 IN	MLP		89.	Add and store the result of
	M1-I		623.	7 x 89 in memory No. 1
M-1 OUT	ZAD		606.	Result of calculation (Total)

7.  $\frac{1}{5 \times (9 - 7) \div 4}$

Key in	Printout	Comment
C		
9		
-	ZAD	9.
7		
x	SUB	7.
5		
÷	MLP	5.
4		
=	DIV	4.
	EQU	2.5000
	INV	0.4000
1/x		Result of 5 x (9 - 7) ÷ 4

8. To calculate the mean value and the standard deviation of 1.23, 45.6, and 7.89:

Key in	Printout	Comment
C		
1		
.		
2		
3		
Σ in	ADD	1.23
4		
5		
.		
6		
Σ in	ADD	45.6
7		
.		
8		
9		
Σ in	ADD	7.89
Σ out	MEAN	18.2400
	SDV	23.9273

If you press the . (decimal point) key just before pressing the Σ out key, the standard deviation value is calculated by the following formula:

$$\sigma = \sqrt{\frac{\sum I^2 - \frac{(\sum I)^2}{N}}{N}}$$

(continued on next page)

Calc

If you do not press the . (decimal point) key, the standard deviation value is calculated by this formula:

$$\sigma = \sqrt{\frac{\sum I^2 - \frac{(\sum I)^2}{N}}{N-1}}$$

*Note:* Overflow will occur if this formula is used when N=1.

Where

- $\sum I$  = the sum of the input parameters
- $\sum I^2$  = the sum of the squares of the input parameters
- N = the number of input parameters
- $\sigma$  = the standard deviation

If you press the = (equal) key before pressing the  $\Sigma$  in key, you can verify that you have keyed in the correct number(s). If you find the number is incorrect, simply key in the correct number before pressing the  $\Sigma$  in key. If some data is identical, you can perform an abbreviated key in.

9. Calculation of the mean value and standard deviation of 13.5, 24.6, 24.6, 24.6, 7.9:

Key in	Printout		Comment
C			
1			
3			
.			
5			
=	ZAD	13.5	Is the number correct? Yes.
$\Sigma$ in			
2			
4			
.			
6			
=	ZAD	24.6	Is the number correct? Yes.
$\Sigma$ in			
=	EQU	24.6	
$\Sigma$ in			
=	EQU	24.6	
$\Sigma$ in			
7			
.			
8			
=	ZAD	7.8	Is the number correct? No. Key in correct number.
7			
.			
9			
=	ZAD	7.9	Is the number correct? Yes.
$\Sigma$ in			
$\Sigma$ out	MEAN	19.0400	
	SDV	7.8665	

10.  $10 \div 10 \div 10$

Key in	Printout	Comment
C		
1		
0		
$\div$	ZAD 10.	
$\div$	DIV 10.	
$\div$	DIV 10.	
=	EQU 0.1000	

11. Calculation of third power of 2 ( $2^3$ )

Key in	Printout	Comment
C		
2		
X	ZAD 2.	
X	MLP 2.	
X	MLP 2.	
=	EQU 8.	

Note: To calculate the n-th power of a number press the X key n-1 times.

12. Calculation of the root of the following numbers.

$$\sqrt{256}, \quad \sqrt[4]{256}, \quad \sqrt[8]{256}, \quad \sqrt[16]{256}$$

Key in	Printout	Comment
C		
2		
5		
$\sqrt{x}$	ZAD 256.	
	SQRT 16.0000	Result of $\sqrt{256}$
$\sqrt{x}$	SQRT 4.0000	Result of $\sqrt[4]{256}$
$\sqrt{x}$	SQRT 2.0000	Result of $\sqrt[8]{256}$
$\sqrt{x}$	SQRT 1.4142	Result of $\sqrt[16]{256}$

13. Calculation of the cube root ( $\sqrt[3]{}$ ) of 1728. For a very precise answer, it is recommended that the decimal be set for nine fraction digits.

Key in	Printout	Comment
C		
9		
SD	SDP-----	
3		
1/X	ZAD 3.	
	INV 0.333333333	
$X^Y$		
1		
7		
2		
8		
$X^Y$	ZAD 1728.	
	$X^{**}Y$ 12.000000	

(continued on next page)

*Notes:*

1. If you key in 4, 5, 6, etc., instead of 3 in the above example, you can calculate the 4th, 5th, 6th, etc., root of a number.
2. If you set the decimal for fewer than nine in the above example, the less precise answer 11, followed by fraction digits, will result.
3. The 3767, using the 1/X and X<sup>Y</sup> functions, calculates the nth root of a number by raising the number to the 1/n power. Where 1 is not divisible by n and too few fraction digits are used, the root calculation does not result in the precise nth root; the imprecision occurs because the result of 1/n (calculated by the 1/X function) is truncated and rounded at the fraction digit specified—and is then used as input to the X<sup>Y</sup> function. To minimize the effect of this initial truncation and rounding, as many decimal digits as possible should be used in the calculation; nine are the maximum required for achieving the highest precision possible.

**Example:**

With only four fraction digits provided, the problem  $\sqrt[3]{27}$  is handled as  $27^{0.3333}$ . Mathematically, the result is 2.9996704—which is correctly truncated and rounded to 2.9997, but which is not the precise cube root of 27. Setting the decimal to nine causes the problem to be handled as  $27^{0.333333333}$ . Mathematically, this result is 2.99999996704, which is correctly truncated and rounded to 2.99999997. Because it prints eight significant digits, however, the 3767 performs another truncation and rounding that results in the answer 3.0000000.

4. With decimal set to nine, the root obtained may or may not be exact, depending upon the specific mathematical problem being solved.

14.  $(\sin 30)^{0.5}$

Sequence of calculation:

1. sin 30
2.  $(\sin 30)^{0.5}$

Key in	Printout		Comment
C			
M-1 CL			
3			
0			
Sin	ZAD	30.	
	SIN	0.5000	
M-1 IN	M1-I	0.5000	
0			
.			
5			
X <sup>Y</sup>	ZAD	0.5	
M-1 OUT	ZAD	0.5000	
X <sup>Y</sup>	X**Y	0.7071	

*Note:* You must not key-in this example in the following sequence, or the result will be incorrect.

Key In	Printout		Comment
C			
0			
.			
5			
X <sup>Y</sup>	ZAD	0.5	
3			
0			
Sin	ZAD	30.	
	SIN	0.5000	
X <sup>Y</sup>	X**Y	0.0000	Wrong result

15.  $X = A \cos \alpha + B \sin \beta$

Sequence of calculation:

1.  $A \cos \alpha$
2.  $B \sin \beta$
3.  $A \cos \alpha + B \sin \beta$

$1.25 \cos 30 + 3.46 \sin 45$

Key in	Printout	Comment
C		
1		
.		
2		
5		
x	ZAD	1.25
3		
0		
Cos	MLP	
	ZAD	30.
	COS	0.8660
M-1 CL		
M-1 IN	M1-I	1.0825
3		
.		
4		
6		
x	ZAD	3.46
4		
5		
Sin	MLP	
	ZAD	45.
	SIN	0.7071
M-1 IN	M1-I	2.4465
M-1 OUT	ZAD	3.5290

16.  $f = \frac{1}{2\pi\sqrt{LC}}$

Sequence of calculation:

1. LC
2.  $\sqrt{LC}$
3.  $\pi\sqrt{LC}$
4.  $2\pi\sqrt{LC}$
5.  $\frac{1}{2\pi\sqrt{LC}}$

$\frac{1}{2 \times \pi \times \sqrt{20 \times 45}}$

(continued on next page)

Key in	Printout	Comment
C		
2		
0		
x	ZAD	20.
4		
5		
=	MLP	45.
	EQU	900.
$\sqrt{X}$	SQRT	30.0000
x		
$\pi$	MLP	3.1415
x		
2		
=	MLP	2.
	EQU	188.4900
1/X	INV	0.0053

$$17. \quad Y = \frac{\alpha \tan^{-1}(A^2 + B^2) + \beta \tan^{-1}(A^2 - B^2)}{2}$$

Sequence of calculation:

1.  $A^2$
2.  $B^2$
3.  $A^2 + B^2$
4.  $\tan^{-1}(A^2 + B^2)$
5.  $\alpha \tan^{-1}(A^2 + B^2)$
6.  $A^2$
7.  $B^2$
8.  $A^2 - B^2$
9.  $\tan^{-1}(A^2 - B^2)$
10.  $\beta \tan^{-1}(A^2 - B^2)$
11.  $\alpha \tan^{-1}(A^2 + B^2) + \beta \tan^{-1}(A^2 - B^2)$
12.  $\alpha \tan^{-1}(A^2 + B^2) + \beta \tan^{-1}(A^2 - B^2) \div 2$

$$12.3 \tan^{-1}(0.7^2 + 0.3^2) + 5.67 \tan^{-1}(0.7^2 - 0.3^2) \div 2$$

Key in	Printout	Comment
C		
2		
X <sup>Y</sup>	ZAD	2.
.		
7		
X <sup>Y</sup>	ZAD	0.7
	X**Y	0.4900
+		
2		
X <sup>Y</sup>	ADD	
	ZAD	2.
.		
3		
X <sup>Y</sup>	ADD	
	ZAD	0.3
	X**Y	0.0900

(continued on next page)

=	EQU	0.5800
arc tan	ATAN	30.1137
x		
1		
2		
.		
3		
=	MLP	12.3
	EQU	370.3985
M-1 CL		
M-1 IN	M1-I	370.3985
2		
X <sup>y</sup>	ZAD	2.
.		
7		
X <sup>y</sup>	ZAD	0.7
	X**Y	0.4900
-		
2		
X <sup>y</sup>	SUB	
.	ZAD	2.
3		
X <sup>y</sup>	SUB	
	ZAD	0.3
	X**Y	0.0900
=	EQU	0.4000
arc tan	ATAN	21.8014
x		
5		
.		
6		
7		
=	MLP	5.67
	EQU	123.6139
+		
M-1 OUT		
=	ADD	370.3985
	EQU	494.0124
÷		
2		
=	DIV	2.
	EQU	247.0062

$$18. \frac{1}{2} \log e \left( \frac{1+x}{1-x} \right)$$

Sequence of calculation:

1.  $1 - x$
2.  $1 + x$
3.  $\frac{1+x}{1-x}$
4.  $\log e \left( \frac{1+x}{1-x} \right)$
5.  $\log e \left( \frac{1+x}{1-x} \right) \div 2$

$$\frac{1}{2} \log e \left( \frac{1+0.24}{1-0.24} \right)$$

Key in	Printout	Comment
C		
1		
-	ZAD	1.
.		
2		
4		
=	SUB	0.24
	EQU	0.76
M-1 CL		
M-1 IN	M1-I	0.76
1		
+	ZAD	1.
.		
2		
4		
=	ADD	0.24
	EQU	1.24
÷		
M-1 OUT	DIV	0.76
=	EQU	1.6315
ln	LN	0.4895
÷		
2		
=	DIV	2.
	EQU	0.2447

19.  $\frac{1}{2}(e^x - e^{-x})$

Sequence of calculation:

1.  $e^x$
2.  $e^x - e^{-x}$
3.  $(e^x - e^{-x}) \div 2$

$\frac{1}{2}(e^{0.3} - e^{-0.3})$

Key in	Printout	Comment
C		
.		
3		
$e^x$	ZAD	0.3
-	EXP	1.3499
-		
.		
3		
$e^x$	SUB	
	ZAD	0.3-
$\div$	EXP	0.7408
2		
=	DIV	2.
	EQU	0.3045

20.  $a^x \log b$

Sequence of calculation:

1.  $a^x$
2.  $\log b$
3.  $a^x \log b$

$7^4 \times \log 11.23$

Key in	Printout	Comment
C		
4		
$X^Y$	ZAD	4.
7		
$X^Y$	ZAD	7.
	X**Y	2401.0000
x		
1		
1		
.		
2		
3		
log	MLP	
	ZAD	11.23
	LOG	1.0504
=	EQU	2522.0104



21.  $\log \tan \left( \frac{x}{2} + \frac{\pi}{4} \right) + C$

Sequence of calculation:

1.  $\frac{x}{2}$

2.  $\frac{\pi}{4}$

3.  $\frac{x}{2} + \frac{\pi}{4}$

4.  $\tan \left( \frac{x}{2} + \frac{\pi}{4} \right)$

5.  $\log \tan \left( \frac{x}{2} + \frac{\pi}{4} \right)$

6.  $\log \tan \left( \frac{x}{2} + \frac{\pi}{4} \right) + C$

$\log \tan \left( \frac{5.3}{2} + \frac{\pi}{4} \right) + 3.6$

Key in	Printout	Comment
C		
5		
.		
3		
÷	ZAD	5.3
2		
=	DIV	2.
	EQU	2.6500
M-1 CL		
M-1 IN	M1-I	2.6500
$\pi$	ZAD	3.1415
÷		
4		
=	DIV	4.
	EQU	0.7853
M-1 IN	M1-I	0.7853
M-1 OUT	ZAD	3.4353
Tan	TAN	0.0600
log	LOG	1.2219-
+		
3		
.		
6		
=	ADD	3.6
	EQU	2.3781

**CE (clear entry)**

The entry number is cleared, but does not affect the process or result of a calculation performed. The contents in the memories are not changed.

**C (clear)**

The entry number, result of calculation, or special condition such as overflow is cleared. The contents in the memories are not changed.

**SD (Set Decimal)**

This key is used to set a decimal point to the desired position. If the decimal point (.) key is pressed just before this key, all numbers printed after this are punctuated every three digits with commas (integer) and blanks (fraction).

**+ (Plus)**

Addition (the entry number is added to the number in the accumulator and the result is stored there).

**- (Minus)**

Subtraction (the entry number is subtracted from the number in the accumulator and the result is stored there).

Pressing this key just after the SD, C, +, -, X, or  $\div$  key is treated as a negative sign.

**X (Multiply)**

Multiplication (the number in the accumulator is multiplied by the current number and the result is stored there).

**$\div$  (Divide)**

Division (the number in the accumulator is divided by the entry number and the result is stored there). The non-significant remainder is ignored.

**= (Equal)**

The result of calculation or function performed just before pressing this key is printed.

**. (Decimal Point)**

- a. When this key is pressed in an input number, it is treated as a decimal point.
- b. If this key is pressed just before the SD key, it is treated as a signal to do the punctuating function. All numeric data printed after this is punctuated every three digits with commas (integer) and blanks (fraction).
- c. If this key is pressed just before the  $\Sigma$  out key, it changes the formula calculating the standard deviation.

**M-1 CL (Memory 1 Clear)**

The contents of memory 1 are cleared.

**M-2 CL (Memory 2 Clear)**

The contents of memory 2 are cleared.

**M-1 OUT (Memory 1 Readout)**

The contents of memory 1 are ready for use as an entry number for a calculation. The contents of memory 1 remain unchanged after the calculation.

**M-2 OUT (Memory 2 Readout)**

The contents of memory 2 are ready for use as data for a calculation. The contents of memory 2 remain unchanged after the calculation.

**M-1 IN (Memory 1 Input)**

Keyed-in data (or the result of a calculation performed just before pressing this key) is added to the value in memory 1 and the result is stored there.

**M-2 IN (Memory 2 Input)**

Keyed-in data (or the result of a calculation performed just before pressing this key) is added to the value in memory 2 and the result is stored there.

**arc sin (arc sin $\theta$ )**

A calculation of the trigonometric arc sine is performed.

*arc cos (arc cosine)*

A calculation of the trigonometric arc cosine is performed.

*arc tan (arc tangent)*

A calculation of the trigonometric arc tangent is performed.

*Sin (Sine)*

A calculation of the trigonometric sine is performed.

*Cos (cosine)*

A calculation of the trigonometric cosine is performed.

*Tan (tangent)*

A calculation of the trigonometric tangent is performed.

*1/X*

A calculation of the reciprocal of the number in the accumulator is performed and stored in the accumulator.

$\sqrt{X}$

A calculation of the square root of the number in the accumulator is performed and stored in the accumulator.

*In (Natural Logarithm)*

A calculation of logarithm that has a base of e is performed.

*e<sup>X</sup> (e to the Xth power)*

A calculation of e to the Xth power is performed.

*e*

The base of the system of natural logarithm is printed and becomes ready for use in calculation.

$\pi$

The ratio of the circumference of a circle to its diameter or transcendental number is printed and becomes ready for use in calculation.

$\Sigma$  in

This signals that the number just entered is used to calculate mean and standard deviation values. The number of times this key is pressed is counted and is used for the calculations.

$\Sigma$  out

The calculation of mean and standard deviation value of the keyed-in numbers followed by the  $\Sigma$  in key is performed. The results of calculations are printed.

*log (Logarithm)*

A calculation of logarithm that has a base of 10 is performed.

*X<sup>Y</sup>*

This key is used to calculate the y-th power of x.

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*\*Accumulator:* A register in which the result of an arithmetic or logic operation is formed and stored.  
*Acoustic Coupler:* Equipment used to connect a terminal to a host through a telephone handset.

*Buffer:* A type of 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.

*\*Character:* A letter, digit, or other symbol used as part of the organization, control, or representation of data.

*Communicate:* See Online.

*Communication Line.* Any facility, such as a wire or a telephone line, that connects a terminal with a remote device.

*\*CPU (Central Processing Unit):* The unit of a computer that includes the circuits controlling the interpretation and execution of instructions.

*Data Block:* A group of contiguous characters or functions, transmitted or received as a unit.

*Data Set:* A term that is sometimes used for an external modem. See "modem".

*\*EOB (End of Block):* A code that identifies the end of a block of data.

*\*EOM (End of Message):* The specific character or sequence of characters that indicates the termination of a message or record.

*Function:* The normal or characteristic action of anything, such as Form Feed, Tab, Return, and Space.

*Host:* The central processing unit (or a device with similar functions) which is connected to the terminal by a communication line and executes an online operation.

*Line Control:* The combination of operating procedures and control signals by which a telecommunication system is controlled.

*Line Speed:* The maximum rate at which signals may be transmitted over a communication line. Usually measured in bits per second (bps).

*Local:* Pertaining to equipment or devices that are not under control of the central processing unit.

*Maximum print position:* The maximum position to the right that the print head will travel.

*Modem:* A coupling device providing signal conversion functions required for transfer of information between a terminal and communication lines and, also, between communication lines and computer equipment. See Data Set.

*Offline Test:* An integrated terminal test for detecting and isolating a problem in the terminal. This test is also used to verify that off-line operations are error-free.

*Online:* Associated with a CPU, either directly or through a transmission control unit, by cable or a communication line.

*Online Test:* A method by which a terminal or console (host site) may request any of several kinds of tests to be performed upon either the same terminal or console or a different one. This test is also used to verify proper online operations.

*Overflow:* (1) That portion of the result of an operation that exceeds the capacity of the intended unit of buffer. (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.

*Problem Determination Guide (PDG):* A guide that a user can use after finding an irregular condition to determine the action needed to restore normal operation.

*SDLC (Synchronous Data Link Control):* A type of line control.

*S/S (Start-stop):* Asynchronous transmission in which each character (or group of code) is preceded by a start signal and is followed by a stop signal.

*Terminal:* A device capable of transmitting and/or receiving data over a communication line.

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



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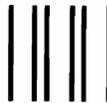
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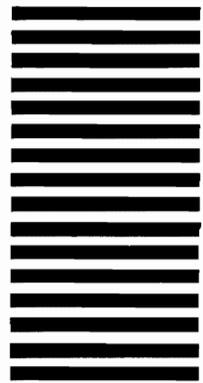
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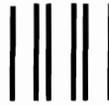
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