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### **IBM System/360 Operating System:**

#### **Time Sharing Option**

#### **Terminals**

Describes how to use the terminals supported by the Time Sharing Option of the IBM System/360 Operating System. It is intended for all TSO terminal users. The operation and characteristics of the following terminals in a TSO environment are discussed:

IBM 2741 Communication Terminal.

IBM 1052 Printer-Keyboard.

Teletype\* Model 33.

Teletype\* Model 35.

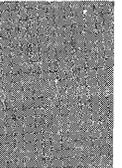
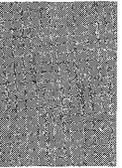
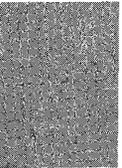
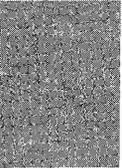
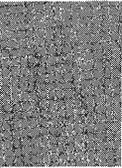
Each section is independent and a user need read only the section describing the terminal he is using.

An appendix describes the LOGON, LOGOFF, PROFILE, and TERMINAL commands which a user issues to control his terminal session.

*IBM System/360 Operating System: Time Sharing Option, Command Language Reference, GC28-6732 is a co-requisite publication.*

Information in this publication for TSO is for planning purposes until that item is available.

\*Trademark of Teletype Corporation.



## Preface

This publication describes how to use the terminals supported by the Time Sharing Option of the IBM System/360 Operating System. It is intended for all TSO terminal users. The operation and characteristics of the following terminals in a TSO environment are discussed:

IBM 2741 Communication Terminal.

IBM 1052 Printer-Keyboard.

Teletype\* Model 33.

Teletype\* Model 35.

The publication is divided into three sections, each describing one type of terminal.

Each section is independent and a user need read only the section describing the terminal he is using.

An appendix describes the LOGON, LOGOFF, PROFILE, and TERMINAL commands which a user issues to control his terminal session.

No prerequisite information is needed to use this book.

*IBM System/360 Operating System: Time Sharing Option, Command Language Reference, GC28-6732* is a co-requisite publication.

### First Edition (March, 1971)

This edition applies to release 20.1, of IBM System/360 Operating System, and to all subsequent releases until otherwise indicated in new editions or Technical Newsletters. Changes are continually made to the information herein; before using this publication in connection with the operation of IBM systems, consult the latest IBM System/360 SRL Newsletter, Order NO. GN20-0360, for the editions that are applicable and current.

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## Introduction

A terminal is a typewriter-like device which you can use for communication with a computing system. The IBM System/360 Operating System Time Sharing Option (TSO) makes the facilities of a computing system available to many terminal users at the same time. The terminals can be installed at different locations away from the site of the computing system. They are connected to the computing system through telephone or other communication lines.

When a terminal user wants to begin a session at a terminal, he begins by turning on the power at his terminal. Then he makes contact with the system, typically by dialing the system's telephone number. Next he identifies himself to the system by a process called "logging on." If he is authorized to use the system, he receives a message that tells him the system is ready to accept his work.

A terminal user defines his work with commands and data. Commands tell the system what kind of operations to perform. Data is the information that is to be processed. When a terminal user has finished his session, he signals that he is finished by a process called "logging off."

This manual describes the basic steps to follow during a terminal session. It describes how to log on, how to enter commands and data, how to correct typing errors, how to interrupt operations at a terminal, and how to end a terminal session. The manual is divided into three independent sections that describe how to conduct a terminal session at three different types of terminals supported by TSO:

- IBM 2741 Communication Terminal
- IBM 1052 Printer-Keyboard
- Teletype\* Models 33 and 35

Note: Terminals which are equivalent to those explicitly supported may also function satisfactorily. The customer is responsible for establishing equivalency. IBM assumes no responsibility for the impact that any changes to IBM-supplied products or programs may have on such terminals.

\*Trademark of Teletype Corporation.

## IBM 2741 Communication Terminal

The IBM 2741 Communication Terminal resembles a conventional IBM Selectric Typewriter mounted on a terminal stand.

Because of this similarity, the 2741 is easy for a beginner to use with TSO. The 2741 has two additional controls not found on the typewriter: the Terminal-Mode switch (labeled COM/LCL) located on the left side of the terminal stand, and the attention key (labeled ATTN) located on the upper right side of the keyboard, replacing the INDEX key.

If the COM/LCL switch is set to LCL, you can use the terminal as a conventional typewriter. To use the 2741 with TSO, set the COM/LCL switch to COM.

The ATTN key is described below in the topic "How to Interrupt Processing at the Terminal."

TSO supports three special features available on the 2741:

- The Transmit Interrupt special feature, described below under "How to Enter Data."
- The Print Inhibit special feature, described below under "Contacting TSO."
- The Receive Interrupt special feature, discussed under "How to Enter Data."

All these special features are recommended for use with TSO.

This chapter discusses:

- How to start a TSO terminal session.
- How to enter data.
- How to interrupt operations from the terminal.
- How to end a TSO terminal session.

### How to Start a TSO Terminal Session

There are two operations involved in starting a TSO terminal session:

1. Contacting the computer -- that is, establishing a connection between your terminal and the main computer system.
2. Contacting TSO -- that is, identifying yourself to TSO.

#### Contacting the Computer

A 2741 can be connected to a computer system by either of two ways: through a non-switched (or leased line) which is a permanent connection or through a switched (or dial) line which is temporary, like a telephone connection. If your terminal has a non-switched line:

1. Make sure the COM/LCL switch is set to COM.
2. Turn the ON/OFF switch located on the right of the keyboard to ON. (If the switch is on, turn it off, then on again.) If your keyboard unlocks, this means the system is ready to receive input data. If your keyboard does not unlock, this means that the system is not available, and you must try later.

If your terminal has a switched (or dial) line with a telephone data set, follow the procedure in Table 1.

If your terminal has a switched line with an acoustic coupler, follow the procedure in Table 2.

Table 1. Telephone Data Set Technique

1. Make sure the COM/LCL switch is set to COM.
2. Turn the ON/OFF switch located on the right of the keyboard to ON.
3. Press the TALK button on the telephone data set.
4. Remove the handset from the cradle and dial the system's telephone number. Your installation should supply the number.
5. Wait for a high-pitched tone. If the number is busy or if there is no answer, hang up and try again.
6. Push the DATA button. The DATA light should go on. Your keyboard will unlock; this means the system is ready to receive input data. If the DATA light goes off at any time during the terminal session, you must retry from step 3.
7. Place the handset in the cradle.

Table 2. Acoustic Coupler Technique

1. Make sure the COM/LCL switch is set to COM.
2. Turn the ON/OFF switch located on the right of the keyboard to ON.
3. Make sure the acoustic coupler:
  - (a) is connected to a power supply.
  - (b) is turned off.
  - (c) is connected to the terminal.
4. Remove the handset from the cradle and dial the system's telephone number. Your installation should supply the number.
5. Wait for a high-pitched tone. If the number is busy or if there is no answer, hang up and try again.
6. When you hear the high pitched tone, place the handset face down in the coupler box. Make sure the cord is in the slot. Close the lid of the acoustic coupler and latch it.
7. Turn on the acoustic coupler. You should do this within 20 seconds of when you hear the high-pitched tone. Your keyboard will unlock, this means the system is ready to receive input data.

## Contacting TSO

After you have established contact with the computer, issue the LOGON command to contact TSO. You have to supply your user identification number (userid). If you do not supply a userid in your LOGON command, the system will prompt you for it.

Some installations will also require:

- A valid password.
- An account number (ACCT operand).
- A procedure name (PROC operand).

For example, if your userid is MYNUM, and the procedure name you are to use is TRYOUT1, you would type:

```
logon mynum proc(tryout1)
```

and hit the RETURN key. Note that you do not have to type in uppercase.

If your installation requires a password of APASS, your userid is MYID, and the procedure name you are to use is TSOPROC; you would type:

```
logon myid/apass proc(tsoproc)
```

and hit the RETURN key. The userid must be the first operand after the LOGON command word. The slash must be entered as a delimiter between the userid and the password. Separate the other operands with a comma or a space.

The procedure name and the account number, if required by your installation, must be enclosed in parentheses.

TSO prompts you for any missing operands on the LOGON command when there are no defaults. Defaults are usually set by each installation; check with your installation manager.

Until you have finished entering the LOGON command, if more than 28 seconds elapse between characters, portions of the command may be lost. TSO will prompt you to reenter the command.

If your 2741 is equipped with the Print Inhibit special feature, you can enter your password without having it printed at the terminal. First, enter the LOGON command and your userid. If your installation requires a password and you have not supplied it with your LOGON command, TSO will type:

```
ENTER PASSWORD__
```

When you type in your password, it will be sent to the system, but will not be printed as you type it in. Effectively, the typing element will be disconnected while you are typing in the password. After you hit the RETURN key to enter the password, the terminal will operate in the usual way, printing each character you type.

In some cases, TSO will indicate that it is processing your LOGON command by responding:

```
LOGON PROCEEDING
```

but when you are logged on it always types:

```
READY
```

The READY message means that you can enter a command. Note that TSO responds in uppercase except when it is displaying data defined as text.

For a discussion of the full facilities and syntax of the LOGON command, see Appendix A.

## How to Enter Data

There are two steps to follow if you want to enter a line of input into the system:

1. Type the line of information.
2. Press the RETURN key.

The system doesn't consider the line of information complete until you hit the RETURN key. Consequently you can correct typing errors in the line of input until you hit the RETURN key.

There are two ways to correct typing errors:

1. Backspace to the error and then retype the line from that point. When you are satisfied that the line contains the correct information, press the RETURN key to enter the information into the system.
2. Hit the ATTN key to delete the entire line. The system acknowledges that it has deleted the line by printing the characters !D. Then it advances the paper to accept a new line.

These techniques are defaults. There are other ways to correct typing errors. You can define these methods with the PROFILE command, which is described in Appendix A.

A terminal session is a series of interactions between your terminal and the system. These interactions follow a pattern like this:

1. The system notifies you that it is ready to accept input by usually printing one of the following:

A message (for example "READY").

A line number (for example, "00180").

A prompting character (an underscore, "\_", followed by a backspace).

2. You type a line of input and correct any typing errors in the line.
3. You hit the RETURN key.
4. When the system is again ready to accept information, it repeats the sequence described in step 1.

If your 2741 is equipped with the Transmit Interrupt special feature, you can either wait for the system to supply a message to indicate that it is ready to accept input or type ahead without waiting for a message. This feature also allows the system to interrupt you while you are entering information. If the system has a high priority message to send to you, it will interrupt the input operation and print the message.

If your 2741 is not equipped with the Transmit Interrupt special feature, you must wait for the system to indicate, by unlocking the keyboard, that is ready to accept input.

A 2741 used with TSO can have one of three different character sets: EBCDIC (Extended Binary Coded Decimal Interchange Code, Part number 1167963), BCDIC (Binary Coded Decimal Interchange Code, Part number 1167938), and Correspondence (Part number 1167043). Figure 1 shows the three keyboards associated with these three character sets. The print element on your terminal will have the last three digits of the part number printed on the top. A few special characters are interpreted differently from their keyboard representation. These are:

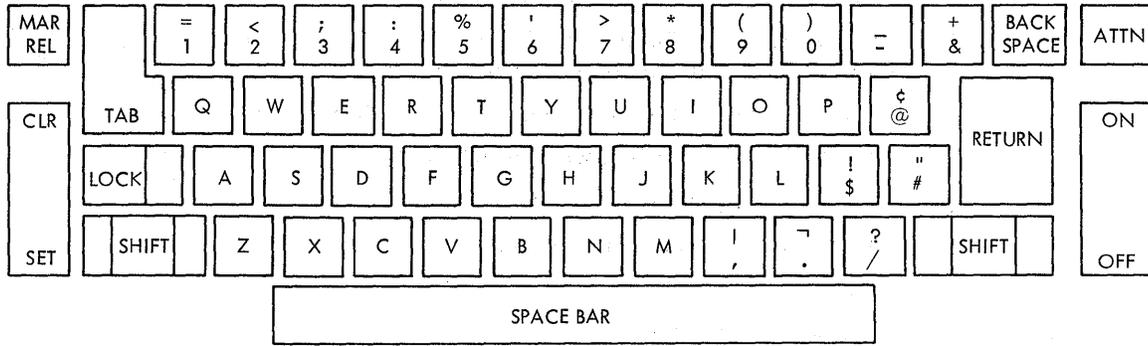
For Correspondence

± (plus-minus)	becomes		(or)
] (right bracket)	becomes	>	(greater than)
[ (left bracket)	becomes	<	(less than)

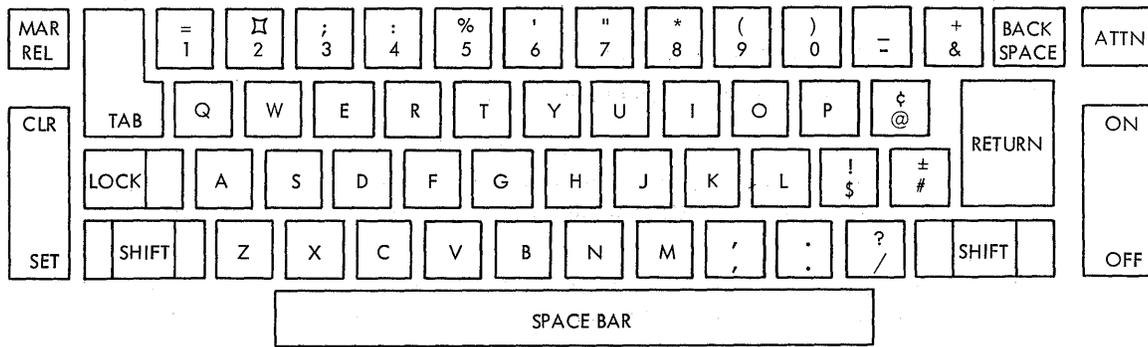
For BCDIC

± (plus-minus)	becomes		(or)
◻ (lozenge)	becomes	-	(not)

**EBCDIC Keyboard** (Part Number 1167963)



**BCDIC Keyboard** (Part Number 1167938)



**Correspondence Keyboard** (Part Number 1169703)

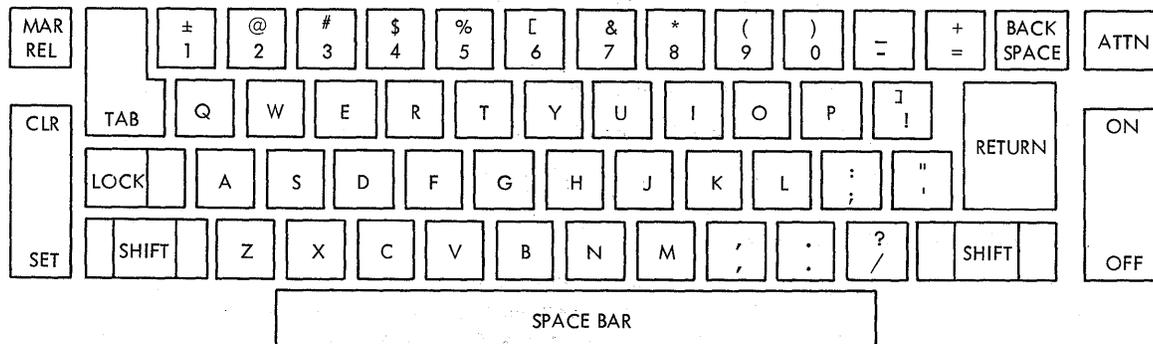


Figure 1. IBM 2741 Communication Terminal Keyboards

## How to Interrupt Operations From the Terminal

An attention interruption is a signal to TSO that you want to interrupt from your terminal the operation that is taking place. You can use an attention interruption to:

- Delete a line of input which you have typed but have not finished entering into the system.
- Stop the listing of output being sent to your terminal by the system.
- Interrupt the command or program that is executing.

There are two ways to signal an attention interruption:

- By hitting the ATTN key.
- By simulating an attention interruption.

### The ATTN Key

The simplest way to cause an attention interruption is to hit the ATTN key. The system replies by printing one of the following responses:

! or !D or !I

If your 2741 is equipped with the Receive Interrupt special feature, the system will respond to the ATTN key at any time. Without the feature, the system will respond to the ATTN key only when you can enter input.

### TSO Responses to an Attention Interruption

There are three possible responses to an attention interruption:

!D or ! or !I

If the attention interruption was used to delete a line of input which you have typed but have not finished entering into the system, TSO responds by printing !D, and advancing the paper to accept a new input line.

If you cause an attention interruption in order to stop printing at your terminal or to stop the execution of a program or command, TSO will print !, advance to a new line, and print a message.

If the message is **READY**, you have interrupted a command.

You can:

- Enter another command.
- Enter a null line, by hitting RETURN to continue execution of the interrupted command.
- Cause another attention interruption to receive the **READY** message.

If the message is a command name, you have interrupted a subcommand.

You can:

- Enter another subcommand of that command.
- Enter a null line, by hitting RETURN to continue execution of the subcommand.
- Cause another attention interruption to receive the **READY** message.

### Simulated Attention Interruptions

Another way to cause an attention interruption is to simulate one. Early in your terminal session, enter the **TERMINAL** command. This command specifies the conditions under which you want a simulated attention interruption to occur. (See Appendix A for a description of the **TERMINAL** command.)

If your 2741 is equipped with both the Transmit Interrupt special feature and the Receive Interrupt special feature, you can cause an attention interruption at any time by hitting the ATTN key. You also can use the **TERMINAL** command to specify when you want to cause a simulated attention interruption.

If your 2741 is equipped with neither the Transmit Interrupt nor the Receive Interrupt features, you can only use the ATTN key when you can enter a line of input. Therefore, early in your terminal session, you should issue a TERMINAL command to specify when TSO is to allow you the opportunity to request an attention interruption. This will allow you to cause an attention interruption in three ways:

1. By hitting the ATTN key when you can enter input.
2. By having previously specified (with the TERMINAL command) that an opportunity to request an attention interruption is to take place after a given time interval. For example, if you specified a 30 second time interval, after 30 seconds during which the computer is executing your command, (and neither input nor output take place) TSO will signal that it is ready to accept an attention interruption by jiggling the print element. You may then hit the ATTN key, enter a character string which you have defined as the attention interruption indicator, or continue by entering a null line. (To enter a null line, hit the RETURN key without typing anything.) After 30 more seconds of program execution, the sequence will repeat.
3. By having previously specified (with the TERMINAL command) that an attention interruption is to take place after a given number of lines of output have been printed at the terminal. For example, if you have specified a 50 line interval, after 50 consecutive lines of output have been printed at the terminal, TSO will signal that it is ready to accept an attention interruption. You may then hit the ATTN key, enter a character string which you have defined as the attention interruption indicator, or continue by entering a null line. (To enter a null line, hit the RETURN key without typing anything.) You will have the opportunity to request an attention interruption after every 50th consecutive line of output.

If your 2741 is equipped with the Receive Interrupt special feature, but not the Transmit Interrupt special feature, you can signal an attention interruption two ways:

1. By using the ATTN key at any time.
2. By having previously specified (with the TERMINAL command) that an attention interruption is to take place after a given number of lines of output have been printed at the terminal. For example, if you have specified a 50 line interval, after 50 consecutive lines of output have been printed at the terminal, TSO will signal that it is ready to accept an attention interruption by jiggling the print element. You may then hit the ATTN key to cause an attention interruption, or continue by entering a null line, (hitting RETURN). You will have the opportunity to request an attention interruption after every 50th consecutive line of output.

### Attention Interruption Levels

When TSO indicates that it is ready to accept a simulated attention interruption, you can hit the ATTN key, enter a character string that you defined in the TERMINAL command, or you can enter a digit from 1 to 9. Entering a 1 is the same as entering the simulated attention interruption character string. If you enter a digit other than 1, you will cause a higher level of attention interruption.

The following sample of a portion of a terminal session illustrates what is meant by a higher level of attention interruption.

Assume you are listing part of a data set using the LIST subcommand of the EDIT command, and have requested through the TERMINAL command that you be given a chance to request a simulated attention interruption after every third line of continuous output.

The listing at the terminal would look like this:

```
list
000010 This is the first line of the data set.
000020 This is the second line of the data set.
000030 This is the third line of the data set.
```

At this point TSO would indicate that you have the opportunity to cause a simulated attention interruption.

If you entered the character string defined in the **TERMINAL** command, (for example **SIMA**), TSO would print **!**, advance the paper one line and print a message telling you that a subcommand of **EDIT** has been interrupted:

**sima!**

**EDIT**

At this point, you could enter any subcommand of **EDIT**, enter a null line to continue with the listing of the data set, or cause another attention interruption.

If you then entered the character string for a simulated attention interruption, or caused another attention interruption by hitting the **ATTN** key, TSO would again print the character **!**, advance the paper and print another message, "**READY.**"

**sima!**

**READY**

This message means that you can enter any command.

The whole session would look like this:

**list**

**000010 This is the first line of the data set.**

**000020 This is the second line of the data set.**

**000030 This is the third line of the data set.**

**sima!**

**EDIT**

**sima!**

**READY**

If instead of entering the character string for simulated attention interruption after the third line of the data set, you enter a **2**, TSO would print the character **!**, advance the paper and print the **READY** message. The sequence would look like this:

**list**

**000010 This is the first line of the data set.**

**000020 This is the second line of the data set.**

**000030 This is the third line of the data set.**

**2!**

**READY**

You could use this facility if you wanted to stop using a subcommand of **EDIT** and start using another command.

Entering a digit in response to an opportunity for a simulated attention interruption is like entering that many attention interruptions, and letting the system respond each time.

## How to End a TSO Terminal Session

To end a terminal session enter either:

**logoff**

or

**logon**

Logging on, causes log off processing and starts a new session without disconnecting the terminal from the system. In either case, TSO will type the following information:

**userid LOGGED OFF TSO AT time ON date**

In place of the lowercase letters, TSO will print out information applicable to your terminal session. If you entered the LOGON command, you would still be connected to the system and would be starting a new terminal session.

When you are finished, turn the terminal off.

## IBM 1052 Printer-Keyboard

You can use the IBM 1052 Printer-Keyboard with TSO. Figure 2 shows the IBM 1052 Printer-Keyboard.

The MAIN POWER switch is located on the side of the attached 1051 control unit, to the right of where the operator sits.

The control panel switches must be set as shown in Table 3. The diagram of the 1052 Keyboard in Figure 3 also shows the correct switch setting.

Several special features and options are available with the 1052 Printer-Keyboard. Those supported by TSO are:

- The Receive Interrupt special feature, discussed below under "How to Interrupt Operations from the Terminal."
- The Transmit Interrupt special feature which is discussed below under "How to Enter Data."
- The Auto EOB special feature, discussed below under "How to Enter Data."
- The Text-Timeout special feature, discussed under "How to Enter Data."

This chapter discusses:

- How to start a TSO terminal session.
- How to enter data.
- How to interrupt operations from the terminal.
- How to end a TSO terminal session.

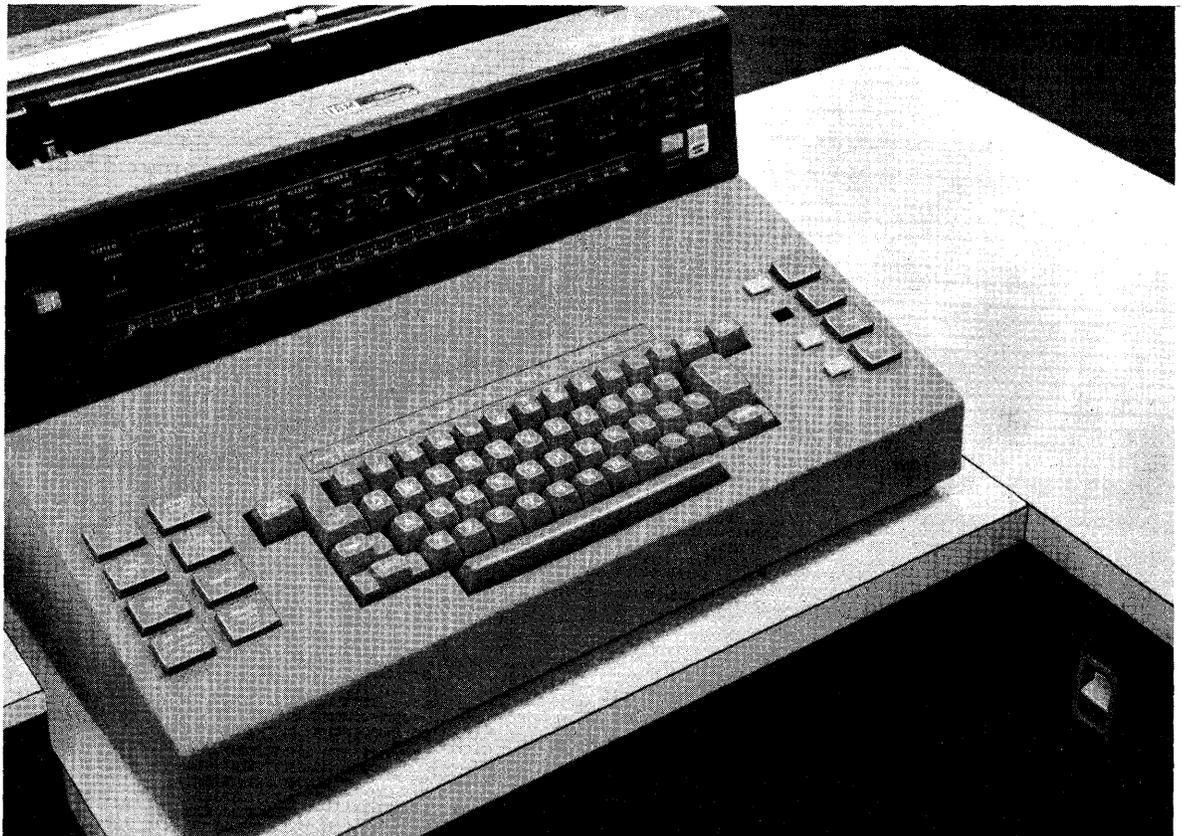


Figure 2. IBM 1052 Printer-Keyboard

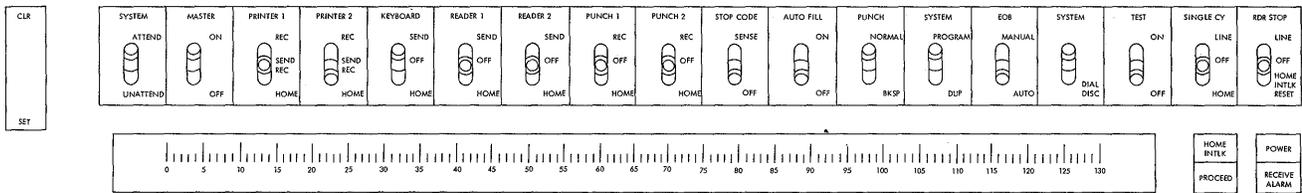


Figure 3. IBM 1052 Printer-Keyboard Control Panel

Table 3. Proper Switch Settings on 1052 Printer-Keyboard Control Panel

SYSTEM	ATTEND
MASTER	ON
PRINTER 1	SEND/REC
PRINTER 2	HOME
KEYBOARD	SEND
READER 1	OFF
READER 2	OFF
PUNCH 1	OFF
PUNCH 2	OFF
STOP CODE	OFF
AUTO FILL	OFF
PUNCH	NORMAL
SYSTEM	PROGRAM
EOB	AUTO
SYSTEM	UP
TEST	OFF
SINGLE CY	OFF
RDR STOP	OFF

## How to Start a TSO Terminal Session

There are two operations involved in starting a TSO terminal session:

1. Contacting the computer -- that is, establishing a connection between your terminal and the main computer system.
2. Contacting TSO -- that is, identifying yourself to TSO.

### Contacting the Computer

There are two ways of connecting a 1052 Printer-Keyboard to a computer system: through a non-switched (or leased line) which is a permanent connection or through a switched (or dial) line which is temporary, like a telephone connection.

If your terminal has a switched (or dial) line with a telephone data set, follow the procedure in Table 4.

If your terminal has a switched line with an acoustic coupler, follow the procedure in Table 5.

If your terminal has a non-switched line:

1. Make sure the control panel switches are set as shown in Table 3. (The correct settings are also shown in Figure 3.)
2. Turn the MAIN POWER switch located on the side of the 1051 Control Unit to ON. Your keyboard will unlock and the PROCEED light will go on. This means the system is ready to receive input data. If the PROCEED light does not go on, hit the REQUEST key. If the PROCEED light still doesn't go on, the system is unavailable and you must try again later.

Table 4. Telephone Data Set Technique

1. Make sure the control panel switches are set as shown in Table 3. (The correct settings are also shown in Figure 3.)
2. Turn the MAIN POWER switch located on the side of the 1051 Control Unit to ON.
3. Press the TALK button on the telephone data set.
4. Remove the handset from the cradle and dial the system's telephone number. Your installation should supply the number.
5. Wait for a high-pitched tone. If the number is busy or if there is no answer, hang up and try again.
6. Push the DATA button. The DATA light should go on. Your keyboard will unlock and the PROCEED light will go on. This means the system is ready to receive input data. If the PROCEED light does not go on, hit the REQUEST key. If the DATA light goes off at any time during the terminal session, you must retry from step 3.
7. Place the handset in the cradle.

Table 5. Acoustic Coupler Technique

1. Make sure the control panel switches are set as shown in Table 3. (The correct settings are also shown in Figure 3.)
2. Turn the MAIN POWER switch located on the side of the 1051 Control Unit to ON.
3. Make sure the acoustic coupler
  - (a) is connected to a power supply.
  - (b) is turned off.
  - (c) is connected to the terminal.
4. Remove the handset from the cradle and dial the system's telephone number. Your installation should supply the number.
5. Wait for a high-pitched tone. If the number is busy or if there is no answer, hang up and try again.
6. When you hear the high pitched tone, place the handset face down in the coupler box. Make sure the cord is in the slot. Close the lid of the acoustic coupler and latch it.
7. Turn on the acoustic coupler. You should do this within 20 seconds after you hear the high-pitched tone. Your keyboard will unlock and the PROCEED light will go on. This means the system is ready to receive input data. If the PROCEED light does not go on, hit the REQUEST key.

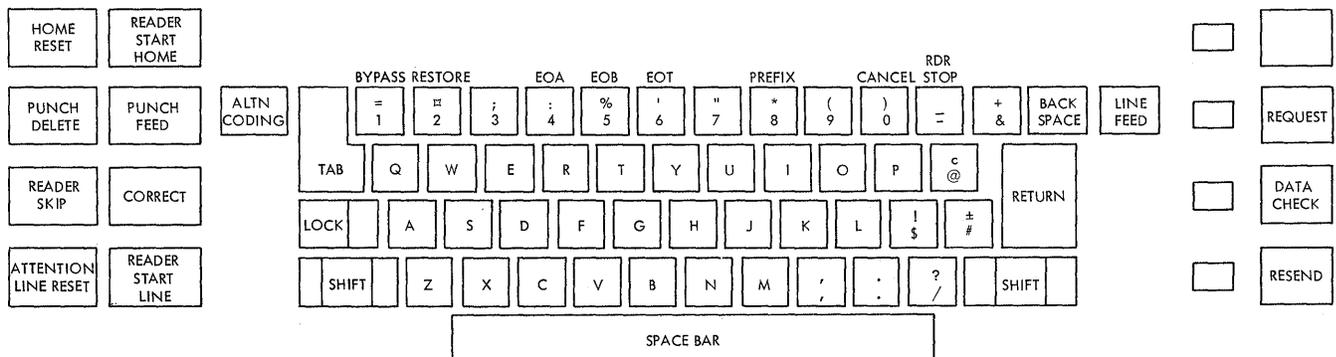


Figure 4. Keyboard of the IBM 1052 Printer-Keyboard

## Contacting TSO

After you have established contact with the computer you can use the LOGON command to contact TSO. You have to supply your user identification number (userid). If you do not supply a userid on your LOGON command, the system will prompt you for it.

Some installations will also require:

- A valid password.
- An account number (ACCT operand).
- A procedure name (PROC operand).

For example, if your userid is MYNUM, and the procedure name you are to use is TRYOUT1, check to see that the PROCEED light is on. If it is off, hit the REQUEST key. Type:

```
logon mynum proc(tryout1)
```

and hit the RETURN key. If the PROCEED light does not go off, hold down the ALTN CODING key and hit the EOB (5) key. Note that you do not have to type in uppercase.

If your installation requires a password of APASS, your userid is MYID, and the procedure name you are to use is TSOPROC; check to see that the PROCEED light is on. If it is off, hit the REQUEST key. Type:

```
logon myid/apass proc(tsoproc)
```

and hit the RETURN key. If the PROCEED light does not go off, hold down the ALTN CODING key and hit the EOB (5) key. The slash must be entered as a delimiter between the userid and the password. The userid must be the first operand after the LOGON command word. Separate the other operands with a comma or a space.

TSO prompts you for any missing operands on the LOGON command when there are no defaults. Defaults are usually set by each installation; check with your installation manager.

The procedure name and the account number, if required by your installation, must be enclosed in parentheses.

You can enter your password without having it printed at the terminal. First, enter the LOGON command and your userid. If your installation requires a password and you have not supplied it with your LOGON command, TSO will type:

```
ENTER PASSWORD__
```

When you type in your password, it will be sent to the system, but will not be printed as you type it in. Effectively, the typing element will be disconnected while you are typing in the password. After you hit the RETURN key to enter the password, the terminal will operate in the usual way, printing each character you type.

In some cases, TSO will indicate that it is processing your LOGON command by responding:

```
LOGON PROCEEDING
```

but when you are logged on it always types:

```
READY
```

The READY message means that you can enter a command. Note that TSO responds in uppercase except when it is displaying data defined as text.

For a discussion of the full facilities and syntax of the LOGON command, see Appendix A.

## How to Enter Data

There are three steps to follow if you want to enter a line of input into the system:

1. Make sure that the PROCEED light is on; if it is off, hit the REQUEST key.
2. Type the line of information.
3. Press the RETURN key. If the PROCEED light doesn't go off, hold down the ALTN CODING key and hit the EOB (5) key.

The system doesn't consider the line of information complete until the PROCEED light goes off. Consequently you can correct typing errors in the line of input until you hit the RETURN key. If you have the Auto EOB special feature, hitting the RETURN key ends a line, that is, causes the PROCEED light to go off. If your 1052 Printer-Keyboard does not have the Auto EOB special feature, that is, if hitting the RETURN key doesn't turn off the PROCEED light, you have to hold down the ALTN CODING key and hit the EOB (5) key to end a line.

There are two ways to correct typing errors before you have sent the line to the system by hitting the RETURN key (or EOB):

1. Backspace to the error and then retype the line from that point. When you are satisfied that the line contains the correct information, press the RETURN key (or EOB) to enter the information into the system.
2. Hold down the ALTN CODING key and hit the EOT (6) key to delete the entire line. The system acknowledges that it has deleted the line by printing the characters ! D. Then it advances the paper to accept a new line.

These techniques are defaults. There are other ways to correct typing errors. You can define these methods with the PROFILE command, which is described in Appendix A.

A terminal session is a series of interactions between your terminal and the system. These interactions follow a pattern like this:

1. The system usually notifies you that it is ready to accept input by printing one of the following:
  - A message (for example "READY").
  - A line number (for example, "00180")
  - A prompting character (an underscore, "\_", followed by a backspace).It then turns on the PROCEED light.
2. You type a line of input and correct any typing errors in the line.
3. You hit the RETURN key (or EOB).
4. The system turns off the PROCEED light.
5. When the system is again ready to accept information, it repeats the sequence described in step 1.

If your 1052 Printer-Keyboard has the Transmit Interrupt special feature, you have a choice; you can "type ahead" without waiting for a message or you can wait for the message. You can enter data whenever the PROCEED light is on.

## How to Interrupt Operations From the Terminal

An attention interruption is a signal to TSO that you want to interrupt the operation that is taking place from your terminal. You can use an attention interruption to:

- Delete a line of input which you have typed but have not finished entering into the system.
- Stop the listing if output being sent to your terminal by the system.
- Interrupt the command or program that is executing.

There are three ways to signal an attention interruption:

1. By holding down the ALTN CODING key and hitting the EOT (6) key.
2. By hitting the LINE RESET/ATTN key.
3. By simulating an attention interruption.

## The LINE RESET/ATTN Key and the EOT Key

The simplest way to cause an attention interruption is to hold down the ALTN CODING key and hit the EOT (6) key when the keyboard is unlocked. The system replies by printing one of the following responses:

**! or !D or !!**

If your 1052 Printer-Keyboard is equipped with the Receive Interrupt special feature, and the keyboard is locked up, (the PROCEED light is not on), you can cause an attention interruption by hitting the LINE RESET/ATTN key. Make sure that the PROCEED light is not on, (and will not come on if you hit the REQUEST key).

## TSO Responses to an Attention Interruption

There are three possible responses to an attention interruption.

If the attention interruption was used to delete a line of input which you have typed but have not finished entering into the system TSO responds by printing !D, advancing the paper, and unlocking the keyboard to accept a new input line.

If you cause an attention interruption in order to stop printing at your terminal or to stop the execution of a program or command, TSO will print either ! or !!, advance to a new line, and print a message.

If the message is **READY**, you have interrupted a command.

You can:

- Enter another command.
- Enter a null line, by hitting RETURN to continue execution of the interrupted command.
- Cause another attention interruption to receive the **READY** message.

If the message is a command name, you have interrupted a subcommand.

You can:

- Enter another subcommand of that command.
- Enter a null line, by hitting RETURN to continue execution of the subcommand.
- Cause another attention interruption to receive the **READY** message.

## Simulated Attention Interruptions

Another way to cause an attention interruption is to simulate one. Early in your terminal session, enter the **TERMINAL** command. This command specifies the conditions under which you want a simulated attention interruption to occur. (See Appendix A for a description of the **TERMINAL** command.)

If your 1052 Printer-Keyboard is equipped with the Receive Interrupt special feature, but not the Transmit Interrupt special feature, you can signal an attention interruption three ways:

1. By holding down the ALTN CODING key and hitting the EOT (6) key any time the PROCEED light is on.
2. By using the LINE RESET/ATTN key when the PROCEED light is off (and cannot be turned on with the REQUEST key).
3. By having previously specified (with the **TERMINAL** command) that an attention interruption is to take place after a given number of lines of output have been printed at the terminal. For example, if you have specified a 50 line interval, after 50 consecutive lines of output have been printed at the terminal, TSO will signal that it is ready to accept an attention interruption by jiggling the type element. You may then hold down the ALTN CODING key and hit the EOT key to cause an attention interruption, or enter a null line to continue processing. You will have the opportunity to request an attention interruption after every 50th consecutive line of output.

## Attention Interruption Levels

When TSO indicates that it is ready to accept a simulated attention interruption, you can hold down the ALTN CODING key and hit the EOT (6) key, enter a character string that you defined in the TERMINAL command, or enter a digit from 1 to 9. Entering a 1 is the same as entering the simulated attention interruption character string. If you enter a digit other than 1, you will cause a higher level of attention interruption.

The following example of a portion of a terminal session illustrates what is meant by a higher level of attention interruption.

Assume you are listing part of a data set using the LIST subcommand of the EDIT command, and have requested through the TERMINAL command that you be given a chance to request a simulated attention interruption every third line of continuous output.

The listing at the terminal would look like this:

```
list
000010 This is the first line of the data set.
000020 This is the second line of the data set.
000030 This is the third line of the data set.
```

At this point TSO would indicate that you have the opportunity to cause a simulated attention interruption.

### Entering a Character String

If you entered the character string defined in the TERMINAL command, (for example SIMA), TSO would print !, advance the paper one line and print a message telling you that a subcommand of EDIT has been interrupted:

```
sima!
EDIT
```

At this point, you could enter any subcommand of EDIT, enter a null line to continue with the listing of the data set, or cause another attention interruption.

If you then entered the character string for a simulated attention interruption, or caused an attention interruption by holding down the ALTN CODING key and hitting the EOT (6) key, TSO would again print the character !, advance the paper and print another message, "READY"

```
sima!
READY
```

This message means that you can enter any command.

The whole session would look like this.

```
list
000010 This is the first line of the data set.
000020 This is the second line of the data set.
000030 This is the third line of the data set.
sima!
EDIT
sima!
READY
```

## Entering a Digit

If instead of entering the character string for a simulated attention interruption after the third line of the data set, you enter a 2, TSO would print the character !, advance the paper and print the READY message

list

000010 This is the first line of the data set.

000020 This is the second line of the data set.

000030 This is the third line of the data set.

2!

READY

You could use this facility if you wanted to go from using a subcommand of EDIT to using another command.

Entering a digit in response to an opportunity for a simulated attention interruption is like entering that many attention interruptions, and letting the system respond to each one.

## How to End a TSO Terminal Session

To end a terminal session enter either:

logoff

or

logon

Logging on causes log off processing and starts a new session without disconnecting the terminal from the system. In either case, TSO will type the following information:

userid LOGGED OFF TSO AT time ON date

In place of the lowercase letters, TSO will print out information applicable to your terminal session. If you entered the LOGON command, you would still be connected to the system and would be starting a new terminal session.

When you are finished, turn the MAIN POWER switch to OFF.

# Teletype\* Model 33 and 35

You can use the Teletype\* Model 33 or 35 terminals with TSO. Figure 5 shows the keyboard of the Teletype\* Model 33 and Figure 6 shows the Model 35.

Note: Terminals which are equivalent to those explicitly supported may also function satisfactorily. The customer is responsible for establishing equivalency. IBM assumes no responsibility for the impact that any changes to IBM-supplied products or programs may have on such terminals.

This chapter discusses:

- How to start a TSO terminal session.
- How to enter data.
- How to interrupt operations from the terminal.
- How to end a TSO terminal session.

## How to Start a TSO Terminal Session

There are two operations involved in starting a TSO terminal session:

1. Contacting the computer -- that is, establishing a connection between your terminal and the main computer system.
2. Contacting TSO -- that is, identifying yourself to TSO.

### Contacting the Computer

To make a telephone connection between your Teletype and the computer:

1. Press the ORIG button to obtain a dial tone. The speaker volume control is under the keyboard shelf to the right. Make sure that the volume is high enough for the dial tone to be audible. After you make a contact, you may turn the volume down.
2. Dial the system's telephone number. Your installation should supply you with the number.
3. The system should answer with a high-pitched tone. When you hear it, you are in contact with the system.

If you have a Model 35, press the "K" button on the left side of the control panel.

If there is no answer or if the number is busy, push the CLR button to break the connection and try again later.

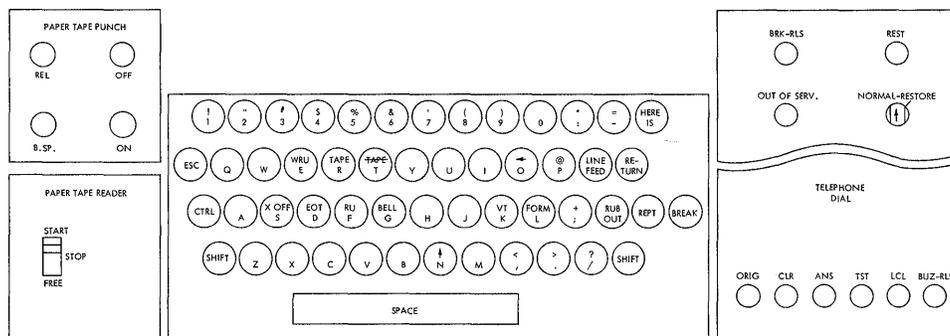


Figure 5. Teletype\* Model 33 Keyboard

\*Trademark of Teletype Corporation

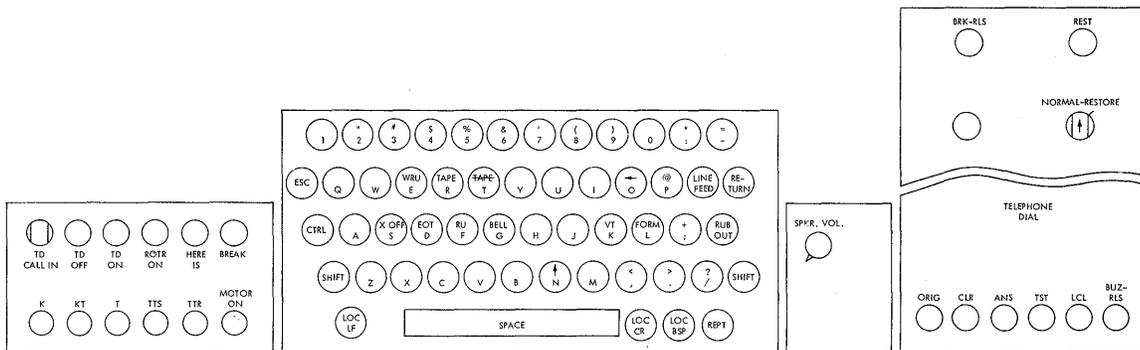


Figure 6. Teletype\* Model 35 Keyboard

## Contacting TSO

After you have established contact with the computer you use the LOGON command to contact TSO. You have to supply your user identification number (userid). If you do not supply a userid on your LOGON command, the system will prompt you for it.

Some installations will also require:

- A valid password.

- An account number (ACCT operand).

- A procedure name (PROC operand).

For example, if your userid is MYNUM, and the procedure name you are to use is TRYOUT1, type:

```
LOGON MYNUM PROC(TRYOUT1)
```

and hit RETURN. (Some TSO installations require you to end a line by holding down the CTRL key and hitting the X-OFF key. Check with your installation manager to determine your requirements.)

Note that Teletype does not have lower case letters.

If your installation requires a password of APASS, your userid is MYID, and the procedure name you are to use is TSOPROC; type:

```
LOGON MYID/APASS PROC(TSOPROC)
```

hit RETURN, (or if your installation requires it, hold down the CTRL key and hit the X-OFF key.)

The slash is used as a delimiter between the userid and the password. Separate the other operands with a comma or a space. The userid must be the first operand after the LOGON command word.

TSO prompts you for any missing operands on the LOGON command when there are no defaults. Defaults are usually set by your installation; check with your installation manager.

The procedure name and the account number, if required by your installation, must be enclosed in parentheses.

In some cases, TSO will indicate that it is processing your LOGON command by responding:

```
LOGON PROCEEDING
```

but when you are logged on it always types:

```
READY
```

The READY message means that you can enter a command.

For a discussion of the full facilities and syntax of the LOGON command, see Appendix A.

## How to Enter Data

A terminal session is a series of interactions between your terminal and the system. These interactions follow a pattern like this:

1. The system notifies you that it is ready to accept input by printing one of the following:

A message (for example, "READY").

A line number (for example, "00180").

A prompting character (a period followed by a carriage return).

The keyboard on a teletype cannot be locked. If the system is not ready to receive input, it will send a character that does not print. This will cause a noise at the Teletype telling you not to enter data. When the system is ready to accept input, it will stop causing this noise.

2. You type a line of input and correct any typing errors in the line.
3. Hit RETURN, (or if your installation requires it, hold down the CTRL key and hit the X-OFF key).
4. When the system is again ready to accept information, it repeats the sequence described in step 1.

There are two steps to follow if you want to enter a line of input into the system:

1. Type the line of information.
2. Hit RETURN, (or if your installation requires it, Hold down the CTRL key and hit the X-OFF key.)

The system doesn't consider the line of information complete until you hit RETURN, (Hold down the CTRL key and hit the X-OFF key).

There are two ways to correct typing errors:

To correct a typing error of one or more characters before you send it to the system, (by hitting RETURN), hold down the SHIFT key and hit the backarrow key. This will print as either a backarrow ← or as an underscore and deletes the character immediately preceding it in the input line.

For example, if you mistype TRIAL as

**TRISL**

You should hold down the CTRL key, hit the backarrow key twice, and retype:

← ← AL

The line would then appear as:

**TRISL ←← AL**

But TSO would interpret the line as:

**TRIAL**

To delete an entire line before you send it to the system, hold down the CTRL key and hit the X key. (If your installation requires you to end a line by holding down the CTRL key and hitting X-OFF, you must do this to end a deleted line; that is, to delete a line, hold down the CTRL key and hit first the X key, then the X-OFF key.)

These techniques are defaults. There are other ways to correct typing errors. You can define these methods with the PROFILE command, which is described in Appendix A.

## How to Interrupt Operations From the Terminal

An attention interruption is a signal to TSO that you want to interrupt the operation that is taking place from your terminal. You can use an attention interruption to:

- Stop the listing of output being sent to your terminal by the system.
- Interrupt the command or program that is executing.

There are two ways to signal an attention interruption:

- You can cause an attention interruption by hitting the BREAK key then hitting the BRK-RLS key. If you have a Model 35, you then must hit the "K" key located on the left side of the control panel. This will reset your terminal so that the system can receive your input.
- By simulating an attention interruption.

When you cause an attention interruption, the system replies by printing one of the following responses:

! or !!

### TSO Responses to an Attention Interruption

If you cause an attention interruption in order to stop printing at your terminal or to stop the execution of a program or command, TSO will print !, advance to a new line, and print a message.

If the message is **READY**, you have interrupted a command.

You can:

- Enter another command.
- Enter a null line, by hitting RETURN to continue execution of the interrupted command.
- Cause another attention interruption to receive the **READY** message.

If the message is a command name, you have interrupted a subcommand.

You can:

- Enter another subcommand of that command.
- Enter a null line, by hitting RETURN to continue execution of the subcommand.
- Cause another attention interruption to receive the **READY** message.

### Simulated Attention Interruptions

Another way to cause an attention interruption is to simulate one. Early in your terminal session, enter the **TERMINAL** command. This command specifies the conditions under which you want a simulated attention interruption to occur. (See Appendix A for a description of the **TERMINAL** command.)

You can signal an attention interruption three ways:

1. If your terminal is typing output, you can cause an attention interruption by hitting the BREAK key then hitting the BRK-RLS key. If you have a Model 35, you then must hit the "K" key located on the left side of the control panel. This will reset your terminal so that the system can receive your input.
2. By having previously specified (with the **TERMINAL** command) that an opportunity to request an attention interruption is to take place after a given time interval. For example, if you specified a 30 second time interval, after 30 seconds during which the computer is executing your command, TSO will signal that it is ready to accept an attention interruption by jiggling the print element. You can enter a digit to specify a specific level of attention interruption, enter a character string which you have defined as the attention interruption indicator, or continue by entering a null line. After 30 more seconds of program execution, the sequence will repeat.
3. By having previously specified (with the **TERMINAL** command) that an attention interruption is to take place after a given number of lines of output have been printed at the terminal. For example, if you have specified a 50 line interval, after 50 consecutive lines of output have been printed at the terminal, TSO will signal that it is ready to accept an attention interruption by jiggling the print element. You can enter a digit to specify a specific level of attention interruption, enter a character string which you have defined as the attention interruption indicator, or continue by entering a null line. You will have the opportunity to request an attention interruption after every 50th consecutive line of output.

## Attention Interruption Levels

When TSO indicates that it is ready to accept a simulated attention interruption, you either can enter a character string that you defined in the **TERMINAL** command or a digit from 1 to 9. Entering a 1 is the same as entering the simulated attention interruption character string. If you enter a digit other than 1, you will cause a higher level of attention interruption.

The following example of a portion of a terminal session illustrates what is meant by a higher level of attention interruption.

Assume you are listing part of a data set using the **LIST** subcommand of the **EDIT** command, and have requested through the **TERMINAL** command that you be given a chance to request a simulated attention interruption every third line of continuous output.

The listing at the terminal would look like this:

```
LIST
000010THE FIRST LINE OF THE DATA SET.
000020THE SECOND LINE OF THE DATA SET.
000030THE THIRD LINE OF THE DATA SET.
```

At this point TSO would indicate that you have the opportunity to cause a simulated attention interruption.

### Entering a Character String

If you entered the character string defined in the **TERMINAL** command, (for example **SIMA**), TSO would print **!**, advance the paper one line and print a message telling you that a subcommand of **EDIT** has been interrupted:

```
SIMA!
EDIT
```

At this point, you could enter any subcommand of **EDIT**, enter a null line to continue with the listing of the data set, or cause another attention interruption.

If you then entered the character string for a simulated attention interruption, or caused an attention interruption by hitting the **BREAK** key and then the **BRK-RLS** key, TSO would again print the character **!**, advance the paper and print another message, **"READY"**

```
SIMA!
READY
```

This message means that you can enter any command.

The whole session would look like this.

```
LIST
000010THE FIRST LINE OF THE DATA SET.
000020THE SECOND LINE OF THE DATA SET.
000030THE THIRD LINE OF THE DATA SET.
SIMA!
EDIT
SIMA!
READY
```

## Entering a Digit

If instead of entering the character string for simulated attention interruption after the third line of the data set, you enter a 2, TSO would print the character !, advance the paper and print the READY message, as follows

```
LIST
000010THE FIRST LINE OF THE DATA SET.
000020THE SECOND LINE OF THE DATA SET.
000030THE THIRD LINE OF THE DATA SET.
2!
READY
```

You could use this facility if you wanted to stop using a subcommand of EDIT and start using another command.

Entering a digit in response to an opportunity for a simulated attention interruption is like entering that many attention interruptions, and letting the system respond to each one.

## How to End A TSO Terminal Session

To end a terminal session enter either:

**LOGOFF**

or

**LOGON**

Logging on, causes log off processing and starts a new session without disconnecting the terminal from the system. In either case, TSO will type the following information:

**userid LOGGED OFF TSO AT time ON date**

In place of the lowercase letters, TSO will print out information applicable to your terminal session. If you entered the LOGON command, you would still be connected to the system and would be starting a new terminal session.

When you are finished, hit the CLR button to break the telephone connection.

### LOGOFF Command

Use the LOGOFF command to terminate your terminal session. Before you enter the LOGOFF command, you should use the EDIT command's SAVE subcommand to store the data sets that you want to save. When you enter the LOGOFF command, the system frees all the data sets allocated to you; data remaining in main storage will be lost.

Note: If you intend to enter the LOGON command immediately and continue processing against a different account number you do not enter LOGOFF. Instead, you can just enter the LOGON command as you would enter any other command.

Command	Operand
LOGOFF	

#### Example 1

Operation: Terminate your terminal session.

LOGOFF
--------

## LOGON Command

Use the LOGON command to initiate a terminal session. Before you can use the LOGON command, your installation must provide you with certain basic information.

- Your user identification (1-7 characters) and, if required by your installation, a password (1-8 alphanumeric characters).
- An account number (may or may not be required for your installation).
- A procedure name (may or may not be required by your installation).

You must supply this information to the system by using the LOGON command and operands. The information that you enter is used by the system to start and control your time sharing session.

You can also use the operands to specify whether or not you want to receive messages from the system or other users.

Command	Operands
LOGON	user-identity[/password]  [ACCT(account)]  [PROC(procedure)]  [SIZE(integer)]  [NOTICES NONOTICES]  [MAIL NOMAIL]

### user-identity and password

specifies your user identification and, if required, a valid password. Your user identification must be separated from the password by a slash (/) and, optionally, one or more standard delimiters (tab, blank, or comma). Your identification and password must match the identification contained in the system's User Attribute Data Set (UADS). If you omit any part of this operand, the system will prompt you to complete the operand. (Printing is suppressed for some types of terminals when you respond to a prompt for a password.)

### ACCT(account)

specifies the account number required by your installation. If the UADS contains only one account number for the password that you specify, this operand is not required. If the account number is required and you omit it, the system will prompt you for it.

For TSO, an account number must not exceed 40 characters, and must not contain a blank, tab, quotation mark, apostrophe, semicolon, comma, or line control character. Right parentheses are permissible only when left parentheses balance them somewhere in the account number.

### PROC(procedure-name)

specifies the name of a cataloged procedure containing the Job Control Language (JCL) needed to initiate your session.

### SIZE(integer)

specifies the size of the main storage region, in units of 1024 bytes, that you want allocated to your job. The UADS contains a default value for your region size if you omit this operand. The UADS also contains a value for the maximum region size that you will be allowed. This operand will be rejected if you specify a region size exceeding the maximum region size allowed by the UADS (in this case, the UADS value MAXSIZE will be used).

## NOTICES

specifies that messages intended for all terminal users are to be listed at your terminal during LOGON processing. This is the default value if both NOTICES and NONOTICES are omitted.

## NONOTICES

specifies that you do not want to receive messages intended for all users.

## MAIL

specifies that you want messages intended specifically for you to be displayed at your terminal. This is the default value if both MAIL and NOMAIL are omitted.

## NOMAIL

specifies that you do not want to receive messages intended specifically for you.

## How the System Uses LOGON Information

The system uses the information from the LOGON command to:

1. Determine if you are authorized to use the time sharing system.
2. Determine the account that will be used for this session.
3. Determine which cataloged procedure to invoke for your session.

The system does this by comparing your LOGON input with data contained in the User Attribute Data Set (UADS). When the system makes a valid comparison, it invokes the cataloged procedure referred to by either the PROC operand (if specified) or by your UADS data.

The cataloged procedure contains Job Control Language (JCL) statements that define a time sharing task to the Operating System. You can interrupt the LOGON processing while it is executing by causing an attention interruption. The system will prompt you to enter either a LOGON or LOGOFF command. Three courses of action are then available to you:

1. If you want to alter or respecify your LOGON operands, reenter the LOGON command.
2. If you want to continue the LOGON processing, enter a carrier return. Previously entered operands will remain unchanged.
3. If you want to terminate the session, enter the LOGOFF command.

You can use the LOGON command to terminate your current session and initiate a new session using a different password, account, and procedure.

Note: In some instances your installation may require a modification in the way you enter the LOGON command; for instance, you may have to precede LOGON with a quotation mark ("LOGON). Your installation's management is responsible for advising you of such a change.

### Example 1

Operation: Initiate a terminal session.

Known: Your user identification and password..... AJKD58/23XA\$MBT

Your installation does not require an account number or procedure name for LOGON.

```
LOGON AJD58/23XAMBT
```

### Example 2

Operation: Initiate a terminal session.

Known: Your user identification and password.....HEUS951/MO@

Your account number.....288104

The name of a cataloged procedure.....TS951

You do not want to receive messages.

Your main storage space requirement.....90,000 bytes

```
LOGON HEU951/MO@ ACCT(288104) PROC(TS951) SIZE(90) NONOTICES NOMAIL
```

## PROFILE Command

Use the PROFILE command to establish your user profile; that is, to tell the system how you want to use your terminal. You can:

- Define a character-deletion or line-deletion control character.
- Specify whether or not prompting is to occur.
- Specify whether or not you will accept messages from other terminals.
- Specify whether or not you want the opportunity to obtain additional information about messages from a command procedure.
- Specify whether or not you want message numbers for diagnostic messages that may be displayed at your terminal.

Initially, a user profile is prepared for you when arrangements are made for you to use the system. You change the characteristics of your user profile by using the PROFILE command with the appropriate operands. Only the characteristics that you specify explicitly by operands will change; other characteristics remain unchanged. The new characteristics will remain valid from session to session. You must specify at least one operand or the system will ignore the command.

Command	Operands														
Profile	<table border="0"> <tr> <td>[CHAR( {character} )]</td> <td>[LINE( {character} )]</td> </tr> <tr> <td>          {BS}</td> <td>          {ATTN}</td> </tr> <tr> <td>[NOCHAR]</td> <td>[NOLINE]</td> </tr> <tr> <td>[PROMPT]</td> <td>[INTERCOM]</td> </tr> <tr> <td>[NOPROMPT]</td> <td>[NOINTERCOM]</td> </tr> <tr> <td>[PAUSE]</td> <td>[MSGID]</td> </tr> <tr> <td>[NOPAUSE]</td> <td>[NOMSGID]</td> </tr> </table>	[CHAR( {character} )]	[LINE( {character} )]	{BS}	{ATTN}	[NOCHAR]	[NOLINE]	[PROMPT]	[INTERCOM]	[NOPROMPT]	[NOINTERCOM]	[PAUSE]	[MSGID]	[NOPAUSE]	[NOMSGID]
[CHAR( {character} )]	[LINE( {character} )]														
{BS}	{ATTN}														
[NOCHAR]	[NOLINE]														
[PROMPT]	[INTERCOM]														
[NOPROMPT]	[NOINTERCOM]														
[PAUSE]	[MSGID]														
[NOPAUSE]	[NOMSGID]														

### CHAR(character)

specifies the character that you want to use to tell the system to delete the previous character entered. You should not specify a blank, tab, comma, asterisk, or parenthesis because these characters are used to enter commands.

### CHAR(BS)

specifies that a backspace signals that the previous character entered should be deleted. The backspace is the value that is in effect until you change it.

### NOCHAR

specifies that no control character is to be used for character deletion.

### LINE(character)

specifies a control character that you want to use to tell the system to delete the current line.

### LINE(ATTN)

specifies that an attention interruption is to be interpreted as a line deletion control character. The attention interruption is the value that is in effect until you change it.

### NOLINE

specifies the no line-deletion control character is needed.

### PROMPT

specifies that you want the system to prompt you for missing information.

### NOPROMPT

specifies that no prompting is to occur.

### INTERCOM

specifies that you are willing to receive messages from other terminal users.

**NOINTERCOM**

specifies that you do not want to receive messages from other terminals.

**PAUSE**

specifies that you want the opportunity to obtain additional information when a message is issued at your terminal while a command procedure is executing. After a message that has additional levels of information is issued, the system will display the word PAUSE and wait for you to enter a question mark (?) or a carrier return.

**NOPAUSE**

specifies that you do not want prompting for a question mark or carrier return.

**MSGID**

specifies that diagnostic messages are to include message identifiers.

**NOMSGID**

specifies that diagnostic messages are not to include message identifiers.

**Example 1**

**Operation:** Establish a complete user profile

**Known:** The character you want to use to tell the system to delete the previous character  
.....#

The indicator that you want to use to tell the system to delete the current line  
.....ATTN

You want to be prompted.

You do not want to receive messages from other terminals.

You want to be able to get second level messages while a command procedure is executing.

You do not want diagnostic message identifiers.

```
PROFILE CHAR(#) LINE(ATTN) PROMPT NOINTERCOM PAUSE NOMSGID
```

**Example 2**

**Operation:** Suppose that you have established the user profile in Example 1. The terminal that you are using now does not have a key to cause an attention interruption. You want to change the line delete control character from ATTN to @ without changing any other characteristics.

```
PROF LINE(@)
```

**Example 3**

**Operation:** Establish and use a line deletion character and a character deletion character.

**Known:** The line deletion character..... &

The character deletion character.....!

```
PROFILE LINE( & ) CHAR(!)
```

Now, if you type:

NOW IS THE TI & AC!BCG!.

and press the carrier return, you will actually enter:

ABC.

## TERMINAL Command

Use the TERMINAL command to define the operating characteristics that depend primarily upon the type of terminal that you are using. You can specify the ways that you want to request an attention interruption and you can identify hardware features and capabilities. The TERMINAL command allows you to request an attention interruption whether or not your terminal has a key for that purpose.

Command	Operands		
{ TERMINAL } { TERM }	[ <u>LINES</u> (integer)]	[ <u>SECONDS</u> (integer)]	[ <u>INPUT</u> ( string )]
	[ <u>NOLINES</u> ]	[ <u>NOSECONDS</u> ]	[ <u>NOINPUT</u> ]
	[ <u>BREAK</u> ]	[ <u>TIMEOUT</u> ]	[ <u>LINESIZE</u> (integer)]
	[ <u>NOBREAK</u> ]	[ <u>NOTIMEOUT</u> ]	

### LINES(integer)

specifies an integer from 1 to 255 that indicates that you want the opportunity to request an attention interruption after that number of lines of continuous output have been directed to your terminal.

### NOLINES

specifies an integer from 10 to 2550 (in multiples of 10) to indicate that you want the opportunity to request an attention interruption after that number of seconds has elapsed during which the terminal has been locked and inactive.

### INPUT(string)

specifies the character string that, if entered between lines of input, will cause an attention interruption. The string cannot exceed four characters in length.

### NOINPUT

specifies that no character string will cause an attention interruption.

### BREAK

specifies that your terminal can be interrupted by the system during input operations.

### NOBREAK

specifies that your terminal does not have the capacity for interruptions by the system during input operations.

### TIMEOUT

specifies that your terminal's keyboard will lock up automatically after approximately nine to 18 seconds of inactivity (applicable to the IBM 1052 Printer-Keyboard without the timeout suppression feature).

### NOTIMEOUT

specifies that your terminal's keyboard does not lock up automatically after a period of inactivity.

### LINESIZE(integer)

specifies the length of the line (the number of characters) that can be printed or displayed at your terminal.

### Example 1

**Operation:** Define the characteristics for an IBM 2741 communications terminal. You can use the attention key for attention interrupts only during input.

**Known:** Output line count for attention interruptions.....56  
 Elapsed time for attention interruptions.....120 seconds  
 The character string for attention interruptions.....XYZ  
 The line size.....80

```
TERMINAL LINE(56) SECONDS(120) INPUT(XYZ) NOBREAK NOTIMEOUT LINESIZE(80)
```

Example 2

Operation: Define the characteristics for an IBM 2741 Communications Terminal. You can use the attention key for attention interruptions during input and output.

Known: The length of line that you want to have printed.....80

```
TERMINAL NOLINES NOSECONDS NOINPUT BREAK NOTIMEOUT LINESIZE(80)
```

Example 3

Operation: Define the characteristics for an IBM 1052 Printer-keyboard on which you can use the attention key to request attention interruptions only during input.

Known: Output line count for attention interruptions.....63

Elapsed time for attention interruptions.....90 seconds

The character string for attention interruptions.....K K K K

The line size.....130

```
TERM LINES(63) SECONDS(90) INPUT(K K K K) NOBREAK TIMEOUT LINESIZE(130)
```

Example 4

Operation: After establishing characteristics as in Example 3, change only the SECONDS operand.

Known: The new value for SECONDS.....30

```
TERM SECONDS(30)
```

## Glossary

*alphameric character:* The letters A through Z, digits 0 through 9, and #, \$, and @.

*attention interruption:* An interruption of instruction execution caused by a remote terminal user hitting the attention key. See also 'simulated attention.'

*attention key:* A function key on remote terminals that causes an interruption of execution by the Central Processing Unit.

*break:* See *receive interruption*.

*cataloged procedure:* A set of job control statements that has been placed in a data set named SYS1.PROCLIB and that can be retrieved by naming the set in a job control language (JCL) EXECUTE (EXEC) statement.

*character-deletion character:* A character within a line of terminal input specifying that it and the immediately preceding character are to be removed from the line by a scanning and editing routine.

*character string:* Any sequence of characters.

*command:* Under TSO, a command is a request from a remote terminal for the execution of a particular program, called a command processor. The command processor is in a command library under the command name. Any subsequent commands processed directly by that command processor are called subcommands.

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

*computing system:* A central processing unit with main storage, input/output channels, control units, storage devices, and input/output devices connected to it.

*conversational:* Describing a program or a system that carries on a dialog with a remote terminal user, alternately accepting input and then responding to the input quickly enough for the user to maintain his train of thought.

*data:* Information used as a basis for calculation, measurement and decision.

*data set:* A telephone device used to transmit telecommunications data.

*default option:* A language statement option that is selected by the operating system control program or a processing program in the absence of a selection by a user.

*default value:* The choice among exclusive alternatives made by the system when no explicit choice is specified by the user.

*delimiter:* A character that groups or separates words or values in a line of input.

*dial-up terminal:* A terminal on a switched network.

*edit mode:* Under the EDIT command an entry mode that accepts successive subcommands suitable for modifying an existing line data set.

*IBM System/360:* A collection of computing system devices that can be connected together in many combinations to produce a wide range of unique and unified computing systems. Although the systems vary in size and performance, they share many characteristics, including a common machine language.

*IBM System/360 Operating System:* An application of the System/360 computing system, in the form of program and data resources, that is specifically designed for use in creating and controlling the performance of other applications. TSO is an optional facility of the Operating System.

*installation:* A general term for a particular computing system, in the context of the overall function it serves and the individuals who manage it, operate it, apply it to problems, maintain it, and use the results it produces.

*interruption:* A transfer of CPU control to the control program of the Operating System. The transfer is initiated automatically by the computing system or by a problem state program through the execution of a supervisor call (SVC) instruction. The transfer of control occurs in such a way that control can later be restored to the interrupted program, or, in systems that perform more than one task at a time, to a different program.

*keyword:* A command operand that consists of a specific character string (such as FORTLIB or PRINT) and optionally a parenthesized value.

*line deletion character:* A terminal character that specifies that it and all preceding characters are to be deleted from a line of terminal input.

*line number:* A number associated with a line in a line data set, which can be used to refer to the line.

*listing:* A display or printout of data.

*LOGOFF:* The TSO command that terminates a user's terminal session.

*LOGON:* The TSO command that a user must enter to initiate a terminal session.

*LOGON procedure:* A cataloged procedure that is executed as a result of a user entering the LOGON command.

**message:** In telecommunications, a combination of characters and symbols transmitted from one point to another on a network.

**name:** A one to eight character alphanumeric term that identifies a data set, a command or control statement, a program, or a cataloged procedure. The first character of the name must be alphabetic.

**non-switched line:** A connection between a remote terminal and a computer that does not have to be established by dialing.

**operand:** In the TSO command language, information entered with a command name to define the data on which a command processor operates and to control the execution of the command processor. Some operands are positional, identified by their sequence in the command input line, others are identified by keywords.

**operating system:** An application of a computing system, in the form of organized collections of programs and data, that is specifically designed for use in creating and controlling the performance of other applications. (See *IBM System/360 Operating System*.)

**operator:** A member of a data processing installation who is responsible for directing the overall operation of a computing system.

**password:** A one- to eight-character symbol assigned to a user that he can be required to supply at LOGON. The password is confidential, as opposed to the user identification. Users can also assign passwords to data sets.

**profile (user):** The set of characteristics that describe the user to the system.

**prompting:** A system function that helps a terminal user by requesting him to supply operands necessary to continue processing.

**receive interruption:** The interruption of a transmission to a terminal by a higher priority transmission from the terminal. Also called a *break*.

**remote terminal:** An input/output control unit and one or more input/output devices usually attached to a system through an IBM 2700-series telecommunications control unit. It may or may not

be physically remote from the system.

**reverse break:** See *transmit interruption*.

**routine:** A part of a program or subprogram that may have general or frequent use.

**separator:** A delimiter used to separate fields in an input line to the system.

**session time:** The elapsed real time from LOGON to LOGOFF.

**simulated attention:** A function that allows terminals without attention keys to interrupt processing. The terminal is queried (for a specified character string meaning "a "attention") after a specified number of seconds of uninterrupted execution or after a specified number of lines of consecutive output.

**subcommand:** For TSO, a subcommand is a request for a particular operation to be performed, the particular operation falling within the scope of work requested by the command to which the subcommand applies.

**switched:** Describing a connection established by dialing between a remote terminal and a computer.

**telecommunication:** The transmission of messages from one location to another over telephone and other communication lines.

**terminal:** See *remote terminal*.

**terminal user:** See *user*.

**think time:** During a terminal session, the elapsed time from the end of a line of system output to the terminal until the end of a line of input.

**time sharing:** A method of using a computing system that allows a number of users to execute programs concurrently and to interact with the programs during execution.

**Time Sharing Option (TSO):** An option of the operating system providing conversational time sharing from remote terminals.

**user:** Under TSO, anyone with an entry in the User Attribute Data Set; anyone eligible to log on.

**USERID:** See *user identification*.

**user identification:** A one- to seven-character symbol identifying each system user.

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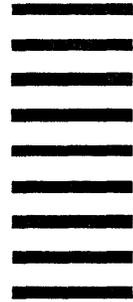
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IBM System/360 Operating System:  
Time Sharing Option  
Terminals

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This Technical Newsletter, a part of release 20.1 of IBM System/360 Operating System, provides replacement pages for the subject publication. These replacement pages remain in effect for subsequent releases unless specifically altered. Pages to be inserted and/or removed are:

Cover, 2  
3  
28.1 - 28.10  
33-35, 35.1, 36-41

A change to the text or a change to an illustration is indicated by a vertical line to the left of the change.

## Summary of Amendments

A chapter describing the IBM 2260 and 2265 Display Stations has been added.

Note: Please file this cover letter at the back of the manual to provide a record of changes.



**Systems Reference Library**

## **IBM System/360 Operating System:**

### **Time Sharing Option**

#### **Terminals**

Describes how to use the terminals supported by the Time Sharing Option of the IBM System/360 Operating System. It is intended for all TSO terminal users. The operation and characteristics of the following terminals in a TSO environment are discussed:

IBM 2741 Communication Terminal.

IBM 1052 Printer-Keyboard.

Teletype\* Model 33.

Teletype\* Model 35.

IBM 2260 Display Station.

IBM 2265 Display Station.

Each section is independent and a user need read only the section describing the terminal he is using.

An appendix describes the LOGON, LOGOFF, PROFILE, and TERMINAL commands which a user issues to control his terminal session.

*IBM System/360 Operating System: Time Sharing Option, Command Language Reference, GC28-6732 is a co-requisite publication.*

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## Preface

This publication describes how to use the terminals supported by the Time Sharing Option of the IBM System/360 Operating System. It is intended for all TSO terminal users. The operation and characteristics of the following terminals in a TSO environment are discussed:

IBM 2741 Communication Terminal.

IBM 1052 Printer-Keyboards.

Teletype\* Model 33.

Teletype\* Model 35.

IBM 2260 Display Station.

IBM 2265 Display Station.

The publication is divided into four sections, each describing one type of terminal.

Each section is independent and a user need read only the section describing the terminal he is using.

An appendix describes the LOGON, LOGOFF, PROFILE, and TERMINAL commands which a user issues to control his terminal session.

No prerequisite information is needed to use this book.

*IBM System/360 Operating System: Time Sharing Option, Command Language Reference, GC28-6732* is a co-requisite publication.

### First Edition (March, 1971)

This edition with Technical Newsletter GN28-2487 applies to release 20.1, of IBM System/360 Operating System, and to all subsequent releases until otherwise indicated in new editions or Technical Newsletters. Changes are continually made to the information herein; before using this publication in connection with the operation of IBM systems, consult the latest IBM System/360 SRL Newsletter, Order No. GN20-0360, for the editions that are applicable and current.

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## IBM 2260 and 2265 Display Station

The IBM 2260 and 2265 Display Stations are visual display devices with display screens and alphameric keyboards for data entry.

The keyboards resemble an IBM Selectric typewriter keyboard with additional control keys which modify and control the format and contents of the display screen. You can enter uppercase letters, digits, and special characters on a 2260 or 2265.

The display screen on a 2260 or a 2265 displays characters, arranged in rows and columns. The standard screen size displays 12 rows of 80 characters each.

This chapter discusses:

- How to start a TSO terminal session.
- How to enter data.
- How to use the TERMINAL command.
- How to interrupt processing from your terminal.
- How to control the display.
- How to end a TSO terminal session.

### How to Start a TSO Terminal Session

An IBM 2260 or 2265 Display Station is permanently connected to a computer system through a direct (or leased) line. When you turn the power on at your display station, your terminal is in contact with the computer system.

The POWER control knob on the IBM 2260 is located on the right side panel of the display screen. Pull the knob out to turn the power on and push it in to turn the power off. The same knob controls the intensity of the display image. Turn the knob clockwise to brighten the image and turn it counterclockwise to make the image less bright.

The POWER OFF key on the IBM 2265 Display Station is located on the front of the display screen unit just to the right of the screen. The POWER ON key is just below it. The brightness control knob is just above the two power keys. Turn the brightness control knob clockwise to make the image brighter and counterclockwise to make it less bright.

Figure 7 shows the keyboards of the 2260 and 2265 Display Stations.

To start a TSO terminal session:

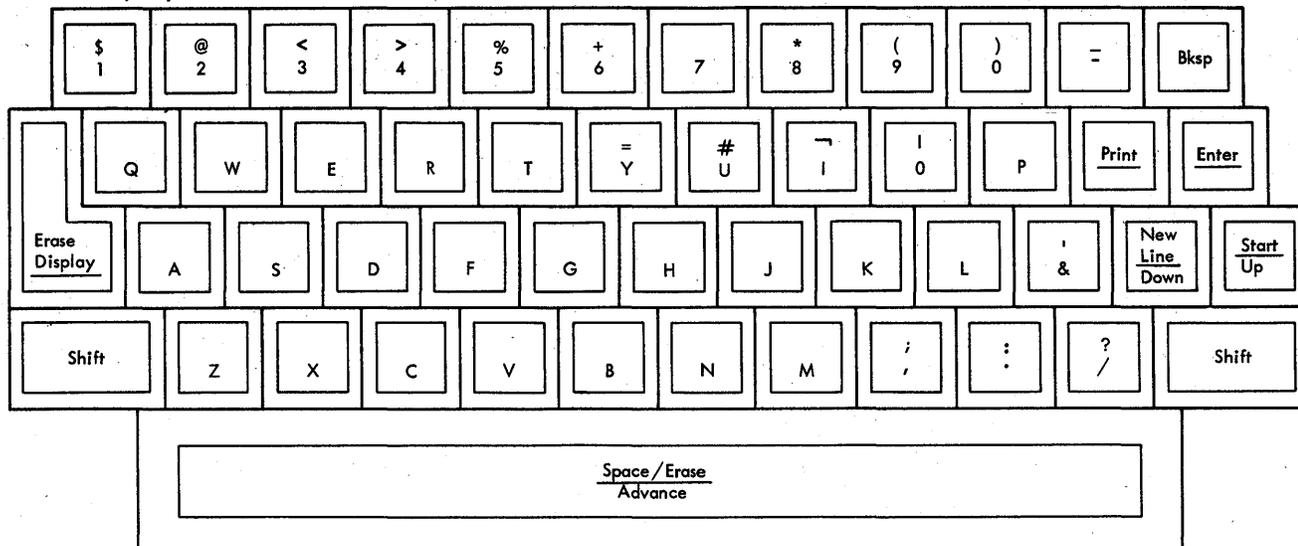
1. Turn the power on at your Display Station.
2. Using the cursor control keys, move the cursor to the upper left corner of the screen. The cursor is the control symbol that indicates where the next character in a row will go. Table 6 shows what the cursor looks like. The examples in this book, show the 2265 cursor.

Table 6. 2260 and 2265 Display Screen Control Symbols

Start of Message	▶
2265 Non-destructive Cursor	-
2260 Non-destructive Cursor	■
Destructive Cursor	■
End of Message	■
New Line Symbol	▲

This table contains the special characters substituted for the 2260 and 2265 control symbols.

2260 Display Station



2265 Display Station

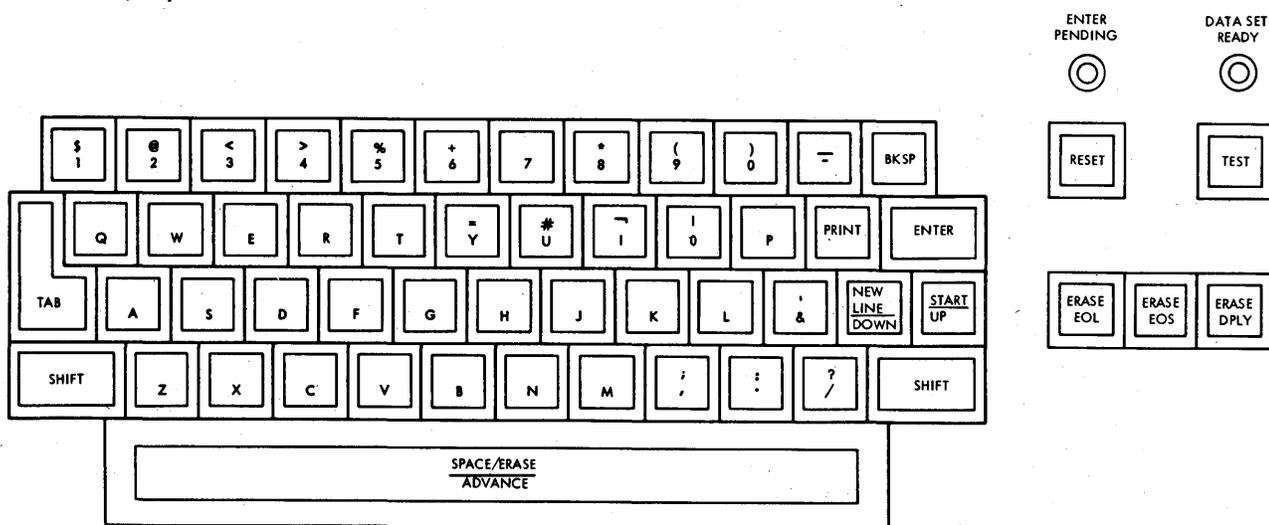


Figure 7. Keyboards for 2260 and 2265 Display Station

There are two types of cursors, the Non-destructive cursor and the Destructive Cursor. The Non-destructive cursor is a standard feature on the IBM 2265 Display Station and is a recommended special feature on the IBM 2260 Display Station. This chapter assumes your terminal has a Non-destructive cursor on your terminal. See How to Control the Display for more information.

You can move the cursor in four different ways:

- a. Forward—to move the cursor forward, use the SPACE/ERASE/ADVANCE key and do not hold the SHIFT key down. If the cursor is at the last position in the line, it will go to the first on the next line.
- b. Backward—to move the cursor back, use the BKSP key. If the cursor is at the first position in the line, it will go to the last position in the line above.
- c. Up—to move the cursor up a line without changing the lateral position, use the START/UP key without holding down the SHIFT key. If the cursor is on the top line, it will move to the bottom line.
- d. Down—to move the cursor down a line without changing its lateral position, use the NEWLINE/DOWN key without holding down the SHIFT key. If the cursor is at the bottom line, it will move to the top.

After you have positioned the cursor, the top line of your screen should look like this:

—

3. Hold down the SHIFT key and hit the START/UP key. This will put a Start-Of-Message (▶) symbol in the position the cursor occupies and move the cursor to the right of it.

This is the only time you should hit the START key. After you are logged on, TSO will prompt you for input by displaying a Start of Message (▶) symbol.

The first line of the display should look like this:

▶—

4. Use the LOGON command to identify yourself to TSO. You have to supply your user identification (userid). Some installations will also require:

A valid password.

An account number (ACCT number).

A procedure name (PROC operand).

You first type the word LOGON, then your userid with a space between the two. If your installation requires a password, place it directly after the userid separating the two with a slash. The other operands, account number and procedure name, follow if required separated with spaces or commas.

For example, if your userid is MYNUM and the procedure name you are to use is TRYOUT1, type:

```
LOGON MYNUM PROC(TRYOUT1)
```

Your screen will look like this:

```
▶LOGON MYNUM PROC(TRYOUT1) _
```

Hit the ENTER key. The display will look like this:

```
LOGON MYNUM PROC(TRYOUT1) ▲
```

—

As another example, if your installation requires a password of APASS, your userid is MYID, and the procedure name you are to use is TSOPROC; you would make sure the Start of Message (▶) symbol is on the display screen, then type:

```
LOGON MYID/APASS PROC(TSOPROC)
```

and hit the enter key. The display would look like this:

```
LOGON MYID/APASS PROC(TSOPROC) ▲
```

TSO will sometimes reply to your LOGON command by displaying:

```
LOGON PROCEEDING ▲
```

but when you are logged on it will display:

```
READY%
```

```
▶-
```

This message with the Start of Message (▶) symbol means that you can enter any command.

## How to Enter Data

A terminal session is a series of interactions between your terminal and the system. These interactions follow a pattern like this:

1. The system notifies you that it is ready to accept input by displaying one of the following:

A message (for example "READY").

A line number (for example, "00180")

These displays are followed by a Start of Message (▶) symbol. The Start of Message (▶) symbol means that TSO is ready to accept your input.

2. You type a line of input and correct any typing errors in the line by backspacing the cursor and retyping.

If you make a typing error you can correct it before you hit the ENTER key by backspacing the cursor and retyping. If you want to replace a character by a space, hold down the SHIFT key and hit the SPACE/ERASE/ADVANCE key. You should not use the cursor to correct errors in portions of the display that have already been sent to TSO. Doing this will correct the display but will have no effect on the information TSO has already received.

3. You hit the ENTER key.
4. The system locks the keyboard.
5. When the system is again ready to accept information, it repeats the sequence described in step 1.

Note that once the system displays the Start of Message (▶) symbol, it will not display any messages until you hit the ENTER key.

For example if after receiving the Start of Message (▶) symbol you typed:

```
THIS IS A LINE OF INPUT
```

The display would look like this:

```
▶THIS IS A LINE OF INPUT _
```

If you hit the ENTER key, the display would look like this:

```
▶THIS IS A LINE OF INPUT ■
```

The cursor ( \_ ) is replaced by the end of message (■) symbol. When TSO reads the line, it replaces the End of Message (■) symbol with a New Line (▲) symbol unless you have positioned the cursor on the next line by entering a New Line symbol. To enter a NEW LINE (▲) symbol, hold down the SHIFT key and hit the NEWLINE/DOWN key, before hitting the ENTER key.

When you hit the ENTER key, TSO would only receive

THIS IS A LINE OF INPUT

If you had held down the SHIFT key and hit the NEWLINE instead of the ENTER key and typed:

AND THIS ALSO IS INPUT \_

The display would look like this:

▶THIS IS A LINE OF INPUT ▲

AND THIS ALSO IS INPUT \_

If you would now hit the ENTER key TSO would then receive two lines

THIS IS A LINE OF INPUT

AND THIS ALSO IS INPUT

If the input you are typing is longer than one row on the display screen, the data will automatically go onto the next row, but TSO will interpret it as one line.

If you used the NEWLINE key then any data in a row to the right of a New Line symbol is not sent to TSO.

To summarize, a line of input to TSO is the data between a Start of Message (▶) symbol or a New Line (▲) symbol, and an End of Message (⇒) symbol or a New Line (▲) symbol.

## How to Use the TERMINAL Command

You use the TERMINAL command to specify to TSO:

- What character string you want to use to cause an attention interruption. Attention interruptions are discussed under "How to Interrupt Processing From the Terminal."
- A time interval in seconds. After this time interval has elapsed without opportunity for you to enter input, TSO will allow you to cause an attention interruption. This is discussed in more detail under "How to Interrupt Processing From the Terminal."
- What character string you want to use to clear the display screen. Clearing the screen is discussed below under "How to control the Display."

The options you specify in a TERMINAL command remain in effect until the next time you issue a TERMINAL command or until the end of a session. This means that you should enter a TERMINAL command at the beginning of every TSO session, unless your installation has provided defaults. Your installation may provide a default TERMINAL command through the LOGON procedure you name in the LOGON command. Check with your installation to see what defaults exist for your system.

A TERMINAL command consists of the word TERMINAL, which may be abbreviated TERM, and a series of words called keywords each separated by spaces or commas.

Type the keyword:

SECONDS(nnnn)

To specify a time interval in seconds. After this number of seconds has elapsed without your having the opportunity to enter input or without output being displayed, TSO will allow you to cause an attention interruption or enter the screen clearing character string. You should specify a number of seconds which is a multiple of 10 and is from 10 to 2250.

CLEAR( string )

To specify the character string you will enter when you want TSO to clear the display screen. This character string can be up to four characters in length.

INPUT( string )

To specify a character string which will cause an attention interruption. This string can be up to four characters in length.

For example, if you want to specify KLR as a screen clearing character string SIMA as an attention interruption character string and the opportunity to request an attention interruption after every 30 seconds without the opportunity to enter input you would type:

```
TERM CLEAR( KLR ) INPUT( SIMA ) SECONDS(30)
```

TSO responds by displaying:

```
READY ▲
```

```
▶-
```

When you receive the Start of Message (▶) symbol after the READY message, you can enter any command.

## How to Interrupt Processing From the Terminal

An attention interruption is a signal to TSO that you want to interrupt from your terminal the operation that is taking place. You can use an attention interruption to:

- Stop the display of output by the system at your terminal.
- Interrupt the command or program that is executing.

There are three ways to cause an attention interruption:

1. By entering as the only input in any line, the character string you defined in the TERMINAL command.
2. By entering as the only input in any line, the character string you defined in the TERMINAL command followed by a digit from one to nine.
3. By entering a digit to request one or more attention interruptions when TSO has given you the opportunity to request an attention interruption.

TSO indicates that you can request an attention interruption by displaying:

```
***▶
```

It does this at two times:

1. When the number of seconds specified in the SECONDS operand of the TERMINAL command has elapsed without your having the opportunity to enter input, or without any output having been displayed.
2. When the screen is full. The discussion "How to Control the Display" describes in detail what happens when the screen is full.

If TSO has displayed

```
***▶
```

to allow you to request an attention interruption, you can enter either:

1. The character string you specified in the INPUT operand of the TERMINAL command, to cause one attention interruption.
2. A digit from one to nine, to cause a higher level attention interruption.

If you do not want an attention interruption, you enter a null line, that is, just hit ENTER.

## TSO Responses to an Attention Interruption

There are two possible responses to an attention interruption:

```
| or ||
```

If you cause an attention interruption in order to stop the display of data at your terminal or to stop the execution of a program or command, TSO will display | and a message.

If the message is READY, you have interrupted a command.

After the Start of Message (▶) symbol has been displayed, you can:

- Enter another command.
- Enter a null line, by hitting ENTER to continue execution of the interrupted command.
- Cause another attention interruption to receive the READY message. If you cause another attention interruption to at this point, TSO will display

||

To indicate that your attention interruption was ignored.

If the message is a command name, you have interrupted a subcommand.

After the Start of Message (▶) symbol has been displayed, you can:

- Enter another subcommand of that command.
- Enter a null line, by hitting ENTER to continue execution of the subcommand. (If you were displaying the contents of a data set, and enter a null line to continue, a few lines of output may be lost.)
- Cause another attention interruption to receive the READY message.

The following portion of a sample terminal session shows how to cause an attention interruption.

Assume you are executing a program you wrote called SUMER and that you specified that you wanted the opportunity to cause an attention interruption every 60 seconds. After 60 seconds without output, or without your having the chance to enter input, (signalled by TSO displaying a Start of Message (▶) symbol), TSO would display:

\*\*\* ▶

to allow you to cause an attention interruption.

At this point, you could enter a null line to continue executing SUMER or cause an attention interruption by entering the character string you defined with the INPUT keyword of the TERMINAL command for example, SIMA.

If you entered this character string, TSO would display the character | and on the next line, display another message, "READY", followed by a Start of Message (#) symbol on the next line.

\*\*\* SIMA| ▲

READY ▲

▶ -

### Attention Interruption Levels

When TSO indicates that it is ready to accept an attention interruption, you can enter a character string that you defined in the TERMINAL command, or you can enter a digit from 1 to 9. Entering a 1 is the same as entering the simulated attention interruption character string. If you enter a digit other than 1, you will cause a higher level of attention interruption.

The following sample portion of a terminal session illustrates what is meant by a higher level of attention interruption.

Assume you are creating a data set using the INPUT subcommand of the EDIT command.

The display at the terminal would look like this:

INPUT ▲

00010 THE FIRST LINE OF THE DATA SET. ▲

00020 THE SECOND LINE OF THE DATA SET. ▲

00030 THE THIRD LINE OF THE DATA SET. ▲

00040▶ -

At this point you want to cause a simulated attention interruption.

### Entering a Character String

If you entered the character string defined in the **TERMINAL** command, (for example **SIMA**), TSO would display **|** and on the next line display a message telling you that you have interrupted a subcommand of **EDIT**.

```
00040 SIMA| ▲
```

```
EDIT ▲
```

```
▶ _
```

At this point, you could enter any subcommand of **EDIT** or cause another attention interruption.

If you then entered the character string for a simulated attention interruption, TSO would display the character **|** and on the next line display another message, "READY", followed by a Start of Message (▶) symbol.

```
SIMA| ▲
```

```
READY ▲
```

```
▶ _
```

This message means that you have caused the highest level of attention interruption and can enter any command.

The whole session would look like this.

```
INPUT ▲
```

```
00010 THE FIRST LINE OF THE DATA SET. ▲
```

```
00020 THE SECOND LINE OF THE DATA SET. ▲
```

```
00030 THE THIRD LINE OF THE DATA SET. ▲
```

```
00040 SIMA| ▲
```

```
EDIT ▲
```

```
SIMA| ▲
```

```
READY ▲
```

```
▶ _
```

### Entering a Digit

If instead of entering only the character string for simulated attention interruption after the third line of the data set, you enter the character string followed by a 2, TSO would display the character **|** and on the next line display the ready message followed by a Start of Message (▶) command.

```
INPUT ▲
```

```
00010 THE FIRST LINE OF THE DATA SET. ▲
```

```
00020 THE SECOND LINE OF THE DATA SET. ▲
```

```
00030 THE THIRD LINE OF THE DATA SET. ▲
```

```
00040 SIMA2| ▲
```

```
READY ▲
```

```
▶ _
```

You could use this facility if you wanted to stop using a subcommand of **EDIT** and start using another command.

If you enter a digit greater than the number of attention interruption levels, you will cause an attention interruption at the highest level available.

## How to Control The Display

There are two kinds of cursors available with the IBM 2260 and 2265 Display Stations, the destructive cursor and the nondestructive cursor. The nondestructive cursor is recommended with TSO and appears underneath and slightly to the left of a character position. It does not interfere with a displayed character, but indicates where the next character entered will go.

The destructive cursor occupies a character position and erases any character in that position. This means that if you move a destructive cursor over a sequence of characters, the characters will be erased and replaced by blanks. This chapter assumes your Display Station has a nondestructive cursor, however the major difference in operation with TSO is that when you backspace to correct an error, (before you hit the ENTER key), if you have a nondestructive cursor, you only have to correct the characters in error; while with a destructive cursor, you have to reenter any characters you passed over while backspacing.

You can erase the screen any time you can enter data by entering as the only input on a line the CLEAR character string you defined in the TERMINAL command.

You should avoid using the cursor controls to erase material which has already been sent to the system. If you do erase part of the display which has already been sent to TSO you should enter the CLEAR character string you defined in the TERMINAL command.

If you erased the Start of Message symbol then:

1. Hold down the SHIFT key and hit the START/DOWN key.
2. Enter the Clear character string you defined in the TERMINAL command.

## Handling a Full Display Screen

When output data is displayed on the next to last line, TSO displays on the next line:

\*\*\*►

When TSO displays this character string, it is about to erase the screen and is allowing you time to review the contents.

You can:

- Enter a null line to allow TSO to erase the screen and continue operation.
- Enter the character string you defined in the terminal command to cause an attention interruption.
- Enter a digit to cause more than one attention interruptions.

No matter what you type, after you hit ENTER, TSO will erase the screen.

Any command or input for a command will be ignored except for the attention interruption character string, or a digit.

If TSO displays the \*\*\*► character string to indicate that you have a chance to cause an attention interruption, because a specified amount of time has elapsed without either input or output and this character string appears on the next to last line, regardless of your response, TSO will erase the screen.

If you enter data on the next to last line of the screen, (or beyond), review the contents before you hit the ENTER key. After you hit the ENTER key, TSO will erase the screen and display the contents of this input at the top of the screen giving you the chance to review your last input.

## How to End a TSO Terminal Session

To end a terminal session enter either:

LOGOFF

or

LOGON

Logging on causes log off processing and starts a new session. In either case, TSO will display the following information:

userid LOGGED OFF TSO AT time ON date

In place of the lowercase letters, TSO will display information applicable to your terminal session.

**NOINTERCOM**

specifies that you do not want to receive messages from other terminals.

**PAUSE**

specifies that you want the opportunity to obtain additional information when a message is issued at your terminal while a command procedure is executing. After a message that has additional levels of information is issued, the system will display the word PAUSE and wait for you to enter a question mark (?) or a carrier return.

**NOPAUSE**

specifies that you do not want prompting for a question mark or carrier return.

**MSGID**

specifies that diagnostic messages are to include message identifiers.

**NOMSGID**

specifies that diagnostic messages are not to include message identifiers.

**Example 1**

**Operation:** Establish a complete user profile

**Known:** The character you want to use to tell the system to delete the previous character  
.....#

The indicator that you want to use to tell the system to delete the current line  
.....ATTN

You want to be prompted.

You do not want to receive messages from other terminals.

You want to be able to get second level messages while a command procedure is executing.

You do not want diagnostic message identifiers.

**PROFILE CHAR(#) LINE(ATTN) PROMPT NOINTERCOM PAUSE NOMSGID**

**Example 2**

**Operation:** Suppose that you have established the user profile in Example 1. The terminal that you are using now does not have a key to cause an attention interruption. You want to change the line delete control character from ATTN to @ without changing any other characteristics.

**PROF LINE(@)**

**Example 3**

**Operation:** Establish and use a line deletion character and a character deletion character.

**Known:** The line deletion character..... &

The character deletion character.....!

**PROFILE LINE( & ) CHAR(!)**

Now, if you type:

**NOW IS THE TI & AC!BCG!.**

and press the carrier return, you will actually enter:

**ABC.**

## TERMINAL Command

Use the TERMINAL command to define the operating characteristics that depend primarily upon the type of terminal that you are using. You can specify the ways that you want to request an attention interruption and you can identify hardware features and capabilities. The TERMINAL command allows you to request an attention interruption whether or not your terminal has a key for that purpose.

Command	Operands
{ TERMINAL } { TERM }	[ LINES(integer) ] [ SECONDS(integer) ] [ INPUT(string) ] [ NOLINES ] [ NOSECONDS ] [ NOINPUT ]
	[ BREAK ] [ TIMEOUT ] [ LINESIZE(integer) ] [ NOBREAK ] [ NOTIMEOUT ]
	[ CLEAR(string) ] [ SCREEN(rows,length) ] [ NOCLEAR ]

### LINES(integer)

specifies an integer from 1 to 255 that indicates you want the opportunity to request an attention interruption after that number of lines of continuous output has been directed to your terminal.

### NOLINES

specifies that output line count is not to be used for controlling an attention interruption. This is the default condition.

### SECONDS(integer)

specifies an integer from 10 to 2550 (in multiples of 10) to indicate that you want the opportunity to request an attention interruption after that number of seconds has elapsed during which the terminal has been locked and inactive.

### NOSECONDS

specifies that elapsed time is not to be used for controlling an attention interruption. This is the default condition.

### INPUT(string)

specifies the character string that, if entered as input, will cause an attention interruption. The string must be the only input entered and cannot exceed four characters in length.

### NOINPUT

specifies that no character string will cause an attention interruption. This is the default condition.

### BREAK

specifies that your terminal keyboard will be unlocked to allow you to enter input whenever you are not receiving output from the system; the system can interrupt your input with high-priority messages. Since use of BREAK with a terminal type which cannot support it can result in loss of output or error, check with your installation system manager before specifying this operand.

### NOBREAK

specifies that your terminal keyboard will be unlocked only when your program or a command you have used requests input.

Note: The default for the BREAK/NOBREAK operand is determined when your installation defines the terminal features.

### TIMEOUT

specifies that your terminal's keyboard will lock up automatically after approximately nine to 18 seconds of no input. (Applicable to the IBM 1052 Printer-Keyboard without the text timeout suppression feature).

#### NOTIMEOUT

specifies that your terminal's keyboard will not lock up automatically after approximately nine to 18 seconds of no input. (Applicable to the IBM 1052 Printer-Keyboard with the text timeout suppression feature).

Note: The default for the TIMEOUT/NOTIMEOUT operand is determined when your installation defines the terminal features.

#### LINESIZE(integer)

specifies the length of the line (the number of characters) that can be printed at your terminal. (Not applicable to the IBM 2260 and 2265 Display Stations.) Default values are as follows:

IBM 2741 Communication Terminal	120 characters
IBM 1052 Printer-Keyboard	120 characters
Teletype 33/35	72 characters

#### CLEAR(string)

specifies a character string that, if entered as input, will cause the screen of an IBM 2260 or 2265 Display station to be erased. The string must be the only input entered and cannot exceed four characters in length.

#### NOCLEAR

specifies that you do not want to use a sequence of characters to erase the screen of an IBM 2260 or 2265 Display Station. This is the default condition.

#### SCREEN(rows,length)

specifies the screen dimensions of an IBM 2260 or 2265 Display Station.

##### rows

specifies the maximum number of lines of data that can appear on the screen.

##### length

specifies the maximum number of characters in a line of data displayed on the screen.

Valid screen sizes are:

6 X 40  
12 X 40  
12 X 80  
15 X 64

Note: The default values for the SCREEN operand are determined when your installation defines the terminal features.

#### Example 1

Operation: Modify the characteristics for an IBM 2741 Communications Terminal to allow operation in unlocked-keyboard mode.

Known: Your terminal supports the break facility. The installation has defined a default of NOBREAK for your terminal.

TERMINAL BREAK

**Example 2**

**Operation:** Modify the characteristics of an IBM 1052 Printer-Keyboard whose attention key cannot be used to interrupt output and whose output line is greater than 80 characters.

**Known:** You want an opportunity to request an attention interruption after 10 consecutive lines of output.

You want to limit the output line length to 80 characters.

**TERMINAL LINES(10) LINESIZE(80)**

**Example 3**

**Operation:** Establish the characteristics of an IBM 2260 Display Station to allow for attention interruption and screen erasure requests.

**Known:** You want an opportunity to request an attention interruption if neither input is requested nor output sent for one minute. You want a \$ to stand for an attention interruption request during a regular input operation.

You want a % to stand for a screen erasure request.

**TERM SECONDS(60) INPUT(\$) CLEAR(%)**

## Glossary

*alphameric character:* The letters A through Z, digits 0 through 9, and #, \$, and @.

*attention interruption:* An interruption of instruction execution caused by a remote terminal user hitting the attention key. See also 'simulated attention.'

*attention key:* A function key on remote terminals that causes an interruption of execution by the Central Processing Unit.

*break:* See *receive interruption*.

*cataloged procedure:* A set of job control statements that has been placed in a data set named SYS1.PROCLIB and that can be retrieved by naming the set in a job control language (JCL) execute (EXEC) statement.

*character-deletion character:* A character within a line of terminal input specifying that it and the immediately preceding character are to be removed from the line by a scanning and editing routine.

*character string:* Any sequence of characters.

*command:* Under TSO, a command is a request from a remote terminal for the execution of a particular program, called a command processor. The command processor is in a command library under the command name. Any subsequent commands processed directly by that command processor are called subcommands.

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

*computing system:* A central processing unit with main storage, input/output channels, control units, storage devices, and input/output devices connected to it.

*conversational:* Describing a program or a system that carries on a dialog with a remote terminal user, alternately accepting input and then responding to the input quickly enough for the user to maintain his train of thought.

*data:* Information used as a basis for calculation, measurement and decision.

*data set:* A telephone device used to transmit telecommunications data.

*default option:* A language statement option that is selected by the operating system control program or a processing program in the absence of a selection by a user.

*default value:* The choice among exclusive alternatives made by the system when no explicit choice is specified by the user.

*delimiter:* A character that groups or separates words or values in a line of input.

*dial-up terminal:* A terminal on a switched network.

*edit mode:* Under the EDIT command an entry mode that accepts successive subcommands suitable for modifying an existing line data set.

*IBM System/360:* A collection of computing system devices that can be connected together in many combinations to produce a wide range of unique and unified computing systems. Although the systems vary in size and performance, they share many characteristics, including a common machine language.

*IBM System/360 Operating System:* An application of the System/360 computing system, in the form of program and data resources, that is specifically designed for use in creating and controlling the performance of other applications. TSO is an optional facility of the Operating System.

*installation:* A general term for a particular computing system, in the context of the overall function it serves and the individuals who manage it, operate it, apply it to problems, maintain it, and use the results it produces.

*interruption:* A transfer of CPU control to the control program of the Operating System. The transfer is initiated automatically by the computing system or by a problem state program through the execution of a supervisor call (SVC) instruction. The transfer of control occurs in such a way that control can later be restored to the interrupted program, or, in systems that perform more than one task at a time, to a different program.

*keyword:* A command operand that consists of a specific character string (such as FORTLIB or PRINT) and optionally a parenthesized value.

*line deletion character:* A terminal character that specifies that it and all preceding characters are to be deleted from a line of terminal input.

*line number:* A number associated with a line in a line data set, which can be used to refer to the line.

*listing:* A display or printout of data.

*LOGOFF:* The TSO command that terminates a user's terminal session.

*LOGON:* The TSO command that a user must enter to initiate a terminal session.

*LOGON procedure:* A cataloged procedure that is executed as a result of a user entering the LOGON command.

**message:** In telecommunications, a combination of characters and symbols transmitted from one point to another on a network.

**name:** A one to eight character alphanumeric term that identifies a data set, a command or control statement, a program, or a cataloged procedure. The first character of the name must be alphabetic.

**non-switched line:** A connection between a remote terminal and a computer that does not have to be established by dialing.

**operand:** In the TSO command language, information entered with a command name to define the data on which a command processor operates and to control the execution of the command processor. Some operands are positional, identified by their sequence in the command input line, others are identified by keywords.

**operating system:** An application of a computing system, in the form of organized collections of programs and data, that is specifically designed for use in creating and controlling the performance of other applications. (See *IBM System/360 Operating System*.)

**operator:** A member of a data processing installation who is responsible for directing the overall operation of a computing system.

**password:** A one- to eight-character symbol assigned to a user that he can be required to supply at LOGON. The password is confidential, as opposed to the user identification. Users can also assign passwords to data sets.

**profile (user):** The set of characteristics that describe the user to the system.

**prompting:** A system function that helps a terminal user by requesting him to supply operands necessary to continue processing.

**receive interruption:** The interruption of a transmission to a terminal by a higher priority transmission from the terminal. Also called a *break*.

**remote terminal:** An input/output control unit and one or more input/output devices usually attached to a system through an IBM 2700-series

telecommunications control unit. It may or may not be physically remote from the system.

**routine:** A part of a program or subprogram that may have general or frequent use.

**separator:** A delimiter used to separate fields in an input line to the system.

**session time:** The elapsed real time from LOGON to LOGOFF.

**simulated attention:** A function that allows terminals without attention keys to interrupt processing. The terminal is queried (for a specified character string meaning "attention") after a specified number of seconds of uninterrupted execution or after a specified number of lines of consecutive output.

**subcommand:** For TSO, a subcommand is a request for a particular operation to be performed, the particular operation falling within the scope of work requested by the command to which the subcommand applies.

**switched:** Describing a connection established by dialing between a remote terminal and a computer.

**telecommunication:** The transmission of messages from one location to another over telephone and other communication lines.

**terminal:** See *remote terminal*.

**terminal user:** See *user*.

**think time:** During a terminal session, the elapsed time from the end of a line of system output to the terminal until the end of a line of input.

**time sharing:** A method of using a computing system that allows a number of users to execute programs concurrently and to interact with the programs during execution.

**Time Sharing Option (TSO):** An option of the operating system providing conversational time sharing from remote terminals.

**user:** Under TSO, anyone with an entry in the User Attribute Data Set; anyone eligible to log on.

**USERID:** See *user identification*.

**user identification:** A one- to seven-character symbol identifying each system user.

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