IBM InfoWindow™ 3472-G

User's Guide
- Setting up your Display Station
- Operations
- Problem Solving Guide

Federal Communications Commission (FCC) Statement

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Instructions to User: Properly shielded and grounded cables and connectors must be used for connection to peripherals in order to meet FCC emission limits. Proper cables are available from IBM authorized dealers. IBM is not responsible for any radio or television interference caused by using other than recommended cables or by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

The above FCC statement applies only to those machines used in the U.S.

United Kingdom Telecommunications Safety Requirements

Notice to Customers: This apparatus is approved under approval number NS/G/23/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

Canadian Department of Communications (DOC) Statement

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

The above DOC statement applies only to those machines used in Canada.

First Edition (September 1989)

Changes are made occasionally to the information herein; any such changes will be reported in subsequent revisions.

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International Business Machines Corporation   Armonk, New York 10504

Exhibit to IBM Statement of Limited Warranty
(U.S. Only)

IBM InfoWindow™ 3472 Display Station Limited Warranty

IF YOU PURCHASED THE IBM InfoWindow 3472 DISPLAY STATION (MACHINE) DIRECTLY FROM INTERNATIONAL BUSINESS MACHINES CORPORATION (IBM), OR ANOTHER IBM ORGANIZATION, UNDER AN AGREEMENT FOR PURCHASE OF IBM MACHINES, THE WARRANTY PROVISIONS THEREIN SHALL PREVAIL AND THIS EXHIBIT AND THE ENCLOSED STATEMENT OF LIMITED WARRANTY SHALL NOT APPLY.

WARRANTY SERVICE DESCRIBED IN THE ENCLOSED STATEMENT OF LIMITED WARRANTY IS AVAILABLE ONLY FOR MACHINES PURCHASED AND LOCATED IN THE UNITED STATES OR PUERTO RICO.

IF YOU PURCHASED THIS MACHINE FROM A SUPPLIER AUTHORIZED BY AN IBM ORGANIZATION TO MARKET THIS MACHINE IN OTHER THAN THE UNITED STATES OR PUERTO RICO, WARRANTY INFORMATION IS AVAILABLE FROM SUCH SUPPLIER.

I. Date of Installation (Warranty Start Date): The Date of Installation, which is the warranty start date, will be the day (Monday through Friday) following the date of delivery of the Machine to you from an IBM Authorized Dealer, an IBM Authorized Distributor or a Reseller who purchased the Machine from such Distributor, as applicable. Delivery is deemed to be complete when the Machine is placed in your possession; however, when the Machine is shipped to you, delivery will be deemed to be complete three days after the date of shipment from an IBM Authorized Dealer, an IBM Authorized Distributor or a Reseller who purchased the Machine from such Distributor, as applicable. You are responsible for setting up this Machine in accordance with the instructions in this manual.

II. Warranty Duration

	1 Year Warranty For Models	3 Years Warranty For Models
IBM 3472	GC1	GC3

III. Type of Service: IBM On-Site Repair (IOR)

IV. Period of Warranty Service Availability: When rendered by IBM, Warranty Service is available 24 hours per day, 7 days per week. When rendered by an IBM Authorized Dealer or an IBM Authorized Distributor, Warranty Service is available during the hours and days prescribed by such Dealer or Distributor.

V. Provider of Warranty Service: IBM or any IBM Authorized Dealer or IBM Authorized Distributor for this machine.

The IBM Statement of Limited Warranty appears in the following pages.

You may be required to provide a dated proof of purchase of this Machine from the IBM Authorized Dealer, the IBM Authorized Distributor or the Reseller who purchased this Machine from such Distributor and evidence of the date of delivery to you in order to obtain warranty service. If you have any questions regarding warranty service, contact your point of purchase, or call IBM at 1-800-428-2569.

InfoWindow is a trademark of International Business Machines Corporation.

Statement of Limited Warranty

DEFINITIONS

The term "Machine" as used herein refers to machines and/or their features, model conversions, machine elements and accessories unless the context requires individual reference.

The terms "Machines" and "machines" are used in substitution for the terms "Products" and "products," respectively. Such latter terms appear in selected IBM agreements.

The term "failing machine" refers to machine or machine element requiring warranty service. The term "exchange machine" refers to a machine or machine element provided by IBM to the Customer under an Exchange Type of Service.

The term "programming" shall mean such programming as IBM may make generally available, without separate charge, for machines of the types ordered by the Customer.

WARRANTIES

Machines purchased from IBM under an agreement for purchase of IBM machines or from an IBM approved Remarketer, or an IBM Authorized Dealer, Distributor or Wholesaler will be 1) newly manufactured by or for IBM from new and serviceable used parts which are equivalent to new in performance in these Machines, 2) assembled by or for IBM from serviceable used parts, or 3) Machines which have been previously installed.

IBM warrants that on the Date of Installation each Machine will be in good working order and will conform to IBM's official published specifications which are available upon request.

The Warranty Period for each Machine commences on its Date of Installation.

Warranty service as described herein may be provided by IBM, an applicable IBM Authorized Dealer, or an IBM selected independent contractor, as indicated in the applicable Exhibit.

IBM will not provide warranty service hereunder for Machines or programming located outside the United States and Puerto Rico.

Service and Parts Warranty

Commencing on the Date of Installation of each machine, model upgrade and feature addition, and continuing for the duration of the Warranty Period, IBM agrees to provide the availability of warranty service at no additional charge except as set forth in this subsection or in the subsection entitled "Travel Expense," to keep the machines, model upgrades and feature additions in, or restore them to, good

working order. Warranty service will be provided by repairing the machines, model upgrades or feature additions or exchanging the machines under one of the Types of Service described in the subsection entitled "Types of Service." The specific Type of Service for each machine, model upgrade or feature addition will be indicated in the applicable Exhibit. Warranty options that provide alternate Types of Service are available for certain Machines under an IBM maintenance agreement.

It is the Customer's responsibility to determine when a machine or machine element requires warranty service. Before requesting warranty service, the Customer will perform any problem determination procedures provided by IBM, and if service is required, the Customer will follow the service request procedures by IBM.

When the Customer presents a failing machine to IBM under a Repair Type of Service, IBM will provide warranty service to restore the failing machine to good working order. Repair Types of Service include remedial maintenance and may include preventive maintenance based on the specific needs of individual machines as determined by IBM. Repair Types of Service may also include lubrication, adjustments and replacement of parts, all as deemed necessary by IBM. Parts, which may be used parts, will be furnished on an exchange basis, and the replaced parts become the property of IBM. When a failing machine is to be repaired under a Repair Type of Service, the Customer is responsible to remove or implement other safeguards to protect all programming, programs, data and removable storage media before such repair.

When the Customer presents a failing machine to IBM under an Exchange Type of Service, it becomes the property of IBM at the time of exchange. An exchange may not be new, but will be in good working order, and becomes the Customer's property at the time of exchange. IBM reserves the right to verify that warranty service for a failing machine is required prior to providing an exchange machine. When a failing machine is exchanged, the Customer will remove all programming, programs, data and removable storage media, and all non-IBM parts, options, alterations and attachments before such exchange. The Customer agrees that all such items not removed will be deemed to have been discarded by the Customer. The Customer will not present to IBM a failing machine for exchange which is defaced, altered or damaged beyond repair. (Repair is as described in

preceding paragraph.) However, if upon inspection IBM determines it has received in exchange a failing machine in such condition, the exchange will be nullified and each party will return to the other the machine or machine element in its possession.

The Period of Warranty Service Availability for IBM On-Site Repair and IBM On-Site Exchange Types of Service are specified in the applicable Exhibit. Outside such Period, warranty service, if requested by the Customer and provided by IBM, will be subject to charge for travel expense plus travel, waiting and service time at IBM's then applicable hourly service rates and minimum charges; however, there will be no additional charges for parts.

The Period of Warranty Service Availability for Customer On-Site Exchange, Customer Carry-In Exchange and Customer Carry-In Repair Types of Service are specified in the applicable Exhibit.

Warranty service described herein does not assure uninterrupted operation of the Machines. IBM may, at its option, store on the Customer's premises maintenance equipment and/or parts that IBM deems necessary to fulfill this warranty.

During the Warranty Period, engineering changes, determined applicable by IBM, will be controlled by IBM and installed as specified by IBM on the Machines. The Customer may, by providing notice subject to written confirmation by IBM, elect to have only mandatory changes, as determined by IBM, installed on Machines so designated.

IBM shall have full, free and safe access to the Machines to provide IBM On-Site Types of Service thereon. The Customer shall promptly inform IBM of any change in a Machine's location during the Warranty Period.

In respect to warranty service provided by IBM, the Customer is responsible for all risk of loss, or damage to, Machines owned by other than IBM during the period such Machines are in transit to and from IBM, except for loss or damage caused by IBM's negligence. However, IBM is responsible for risk of loss of, or damage to, Machines owned by other than IBM while in possession of IBM or in transit from IBM by an IBM selected carrier whose expenses were prepaid by IBM.

The Customer represents and warrants that, at the time a failing machine becomes IBM's property, it will be free of any outstanding liens, security interests or other encumbrances held by any third party.

If the Warranty Period expires on a Friday or Saturday, it will be extended so that the last day of such Warranty Period will be on the following Sunday.

Types of Service

IBM On-Site Repair (IOR)
IBM will provide warranty service for the failing machine at the Customer's location.

IBM On-Site Exchange (IOE)
IBM will 1) deliver the exchange machine to the Customer's location, 2) disconnect the failing machine, 3) connect the exchange machine, 4) verify its operation, and 5) remove the failing machine from the Customer's location.

Customer On-Site Exchange (COE)
IBM will have an exchange machine delivered to the Customer's location. The Customer will 1) disconnect the failing machine and prepare it for shipment to IBM, 2) connect the exchange machine, and 3) verify its operation. The Customer will follow IBM's instructions regarding the shipment of the failing machine to IBM. Such shipment will be at IBM's expense.

Customer Carry-In Exchange (CCE)
The Customer will 1) deliver the failing machine to an IBM Service/Exchange Center or other IBM designated location, 2) pick up the exchange machine and take it to the Customer's location, 3) connect it, and 4) verify its operation.
The Customer, in lieu of such delivery and pick up, may ship the failing machine prepaid, in the original shipping container or equivalent to one of the designated IBM Service/Exchange Centers designated for this delivery method. IBM will then ship the exchange machine to the Customer's locations, prepaid, within the United States and Puerto Rico.

Customer Carry-In Repair (CCR)
The Customer will 1) deliver the failing machine to an IBM Service/Exchange Center or other IBM designated location, 2) when the failing machine is repaired, pick up and return it to the Customer's location, 3) connect it, and 4) verify its operation.
The Customer, in lieu of such delivery and pick up, may ship the failing machine prepaid, in the original shipping container or equivalent, to one of the IBM Service/Exchange Centers designated for this delivery method. IBM will ship the repaired machine to the Customer's location, prepaid, within the United States and Puerto Rico.

Programming

IBM warrants that, when shipped to the Customer, programming designated by IBM for use with a Machine and for which programming services are available will conform to IBM's official published specifications which are available upon request.

IBM does not warrant that functions contained in programming will operate in the combinations which may be selected for use by the Customer or will meet the Customer's requirements.

ALL OTHER PROGRAMMING IS DISTRIBUTED ON AN "AS IS" BASIS.

Additional Provisions for Features and Model Conversions

IBM's warranty for each feature addition or model upgrade requires that the machine on which it is installed is at the then current engineering-change level, is the specific serial-numbered machine for which it was ordered, and has been modified only with changes obtained from IBM specifically for that serial-numbered machine. If these conditions are not met, IBM will attempt to install non-Customer set-up feature additions and model upgrades on the machine, and, if such attempt results in an incorrectly functioning machine, upon Customer request and at IBM's then applicable hourly service rates and minimum charges, parts and material prices and travel expense, IBM will remove the features and/or model upgrades and restore the machine to its prior condition. If such features or model upgrades did not involve the removal of parts which became the property of IBM, such features and model upgrades remain the property of the Customer. If such features and model upgrades did involve the removal of parts which became the property of IBM, such features and model upgrades become the property of IBM and the restored parts become the property of the Customer.

For a feature removal, model downgrade or reinstallation of a previously purchased feature or model conversion, a three-month parts warranty will apply to additional parts, if any, supplied by IBM.

Additional Provisions for Accessories

Accessories have a three-month Warranty Period unless otherwise specified by IBM. During the Warranty Period, the Customer will remove any defective or failing accessory and ship it prepaid to the designated IBM location. IBM will replace such accessory and ship the replacement to the Customer without charge.

Additional Provisions for Machines Containing Funds

The Customer is responsible for removing, controlling and replacing or reloading funds contained in the Machines. IBM will service Machines containing funds only when the cash container cannot be opened prior to repair by IBM, in which case the Customer will remove the funds as soon as the container has been opened.

Service for Additional Charge During the Warranty Period

The services for additional charge described in this subsection are not warranty services. However, unless such services are provided under another written agreement between the Customer and IBM, during the Warranty Period, the following services, if available, will be provided by IBM to the Customer at IBM's i) then generally available hourly service rates and minimum charges for IBM service time, including travel and waiting time, ii) parts and material prices then generally in effect, and iii) charges for travel and shipping expense, all as applicable:

1) Repair of Machine damage, replacement of parts or increase in service time caused by —

   a) failure to continually provide a suitable environment prescribed by IBM including adequate space, electrical power, air conditioning and humidity control;

   b) neglect misuse, including use of the Machines for purposes other than for which designed;

   c) accident: disaster, including water, wind and lightning, transportation; vandalism or burglary;

   d) alterations, including any interconnection to the Machine of non-IBM equipment or devices not under an IBM maintenance agreement;

   e) attachment, including any interconnection to the Machine design;

   f) IBM Machines, other Machines or accessories, except those IBM Machines, other Machines or accessories that are owned by IBM, under warranty from IBM or under an IBM maintenance agreement;

   g) conversions from one IBM model to another or installation or removal of an IBM feature whenever any of these activities was performed by other than IBM, except that this item (g) will apply only during the first three-month period subsequent to such Machine modification; and

h) maintenance or repair of the Machine not performed by IBM.

2) Repair of Machine damage, replacement of maintenance parts (due to other than normal wear) or repetitive service calls caused by the use of, or failure to use, supplies;
3) Service for accessories other than as provided in the subsection entitled "Additional Provisions for Accessories" of this Section;
4) Inspection of altered Machine;
5) Replacement or addition of parts and increase in service time associated with the installation by IBM of an engineering change, required due to the conversion of one IBM model to another or installation or removal of an IBM feature whenever any of these activities was performed by other than IBM;
6) Rearrangement or relocation of Machines and provision of necessary materials; and
7) Replacement of a part not furnished for the Machine by IBM with a directly interchangeable IBM maintenance part, and any increase in service time associated with such activity, except that IBM will not replace any part which is included in an alteration.

Travel Expense

There will be no charge for travel expense associated with warranty service or programming service during the applicable Period of Warranty Service Availability except that actual travel expense will be charged when the site at which the Machine is located is normally inaccessible by both private automobile and scheduled public transportation.

Exclusions

The warranties stated herein do not include 1) furnishing supplies, painting or refinishing the Machines or furnishing material therefore, 2) electrical work external to the Machines, 3) installation, maintenance or removal of alterations or attachments to the Machines, and 4) any service which is impractical for IBM to render because of alterations in, or attachments to the Machines. IBM does not warrant that the operation of Machines or programming will be interrupted or error free or that all programming errors will be corrected.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Preface

This publication describes the operations of the IBM InfoWindow 3472-G and its intended use is for operators and supervisors.

Note: Some display station parts or equipment that appear in this publication may not be available in your country. Ask your IBM marketing representative for details.

Organization

This publication has the following chapters and appendixes:

Chapter 1, "Setup Instructions" provides information for setup of the display station. This chapter should be referred to when a display station element is replaced.

Chapter 2, "Operations" describes operations and adjustments of the display station including print operations.

Chapter 3, "Operator Messages" describes the messages that appear at the bottom of the screen.

Chapter 4, "Keyboard and key functions" describes the functions of the keys.

Chapter 5, "Problem Solving" describes what to do when you have a problem during display station operations. This chapter also provides information for removing and packing the display station parts.

Appendix A, "Setup Mode and Printer Control Operations" provides information for controlling and adjusting the display station and auxiliary devices.

Appendix B, "Programming Considerations" provides programming information that you need when the host application program is developed or modified.

Appendix C, "Keyboard Definition Utility" describes the procedures for modifying the keyboard layout (keyboard definition utility).

Appendix D, "Keyboard Layouts" shows the keyboard layouts available for the display station.

Related Manuals

When you need additional information on the IBM 3270 Information Display System, see the following publications.

- *IBM InfoWindow 3471 and 3472 Introduction and Installation Planning Guide*, GA18-2942

This book will help you prepare the display station site. This book provides introductory, environmental, electrical, and dimensional information.

- *IBM 3174 Subsystem Control Unit User's Guide*, GA23-0216

This book contains operator reference information and problem determination procedures for the IBM 3174 Subsystem Control Unit.

- *IBM 3174 Subsystem Control Unit Help Desk Reference*, GA23-0217

This book is intended for use in the handling of problems that may involve an IBM 3174 Subsystem Control Unit or attached terminals.

- *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218

This book is for anyone who needs data stream level information about 3174 functions for writing programs or researching network problems.

- *IBM 3174 Subsystem Control Unit Customizing Guide*, GA23-0214

This book explains how to customize the microcode for the IBM 3174 Subsystem Control Unit.

- *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061

This book provides the people who manage, analyze, and program IBM 3270 Information Display System installations with reference material concerning the 3274 control unit and attached terminals.

- *IBM 3274 Control Unit Customizing Guide*, GA23-0065

This book is used to install Configuration Support D in 3274 Control Unit.

- *IBM 3270 Information Display System X.25 Operation*, GA23-0204

This book describes the steps required for designated terminals attached to an IBM 3274 Control Unit to communicate over an X.25 network.

Contents

Figures

Chapter 1. Setup Instructions

This chapter describes how to set up your display station and optional auxiliary devices. Perform all activities as shown in the following instructions.

If you have any problem in setting up the display station, see Chapter 5, "Problem Solving" on page 5-1.

Note: Packing material may be required if you relocate or require service on the display station. New packing material can be purchased from IBM if needed.

DANGER

To avoid shock hazard:

- **The power cord must be connected to a properly wired and grounded receptacle.**
- **Any equipment to which this product will be attached must also be connected to properly wired receptacles.**
- **Any cables should not be connected or disconnected during an electrical storm.**
- **Installation, maintenance, or reconfiguration of this product should not be performed during an electrical storm.**

CAUTION:
When the logic element requires disposal, do not handle it as normal trash, because the logic element contains a lithium battery (3 V, 1200 mAh, UL[1] recognized component or equivalent). The lithium battery contains less than 450 mg of lithium and can be harmful to people and may explode if not properly used, handled, or disposed of, such as; (1) thrown into water, (2) overheated to more than 100°C (212°F), or (3) attempting to recharge, repair, or disassemble. When disposing of the logic element, follow your company's safety procedures or local procedures, which define the disposal of such items.

UL/CSA Statement

For use only with UL listed and CSA[2] certified display elements. The display element part number is 16F1200.

The above UL/CSA statement applies only to those machines used in the U.S. and Canada

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[1] Registered trademark of Underwriters Laboratories Inc.

[2] Canadian Standard Association

Check Parts

Check each box □ as you unpack and identify each item. If any are missing, call your IBM marketing representative.
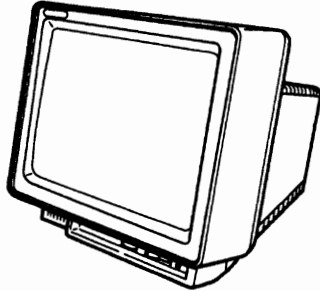
□ Display Element   □ Stand or Lift-Stand[3](P/N 6398210)
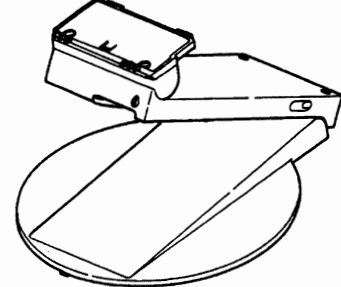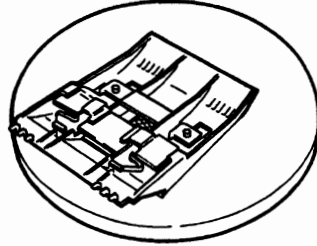
□ Logic Element and Security Key[4]   □ Power Cord   □ Keyboard Overlay
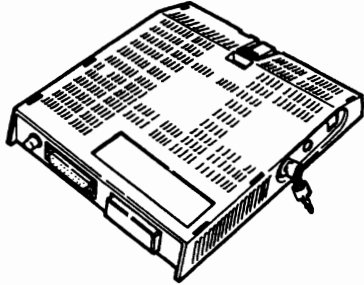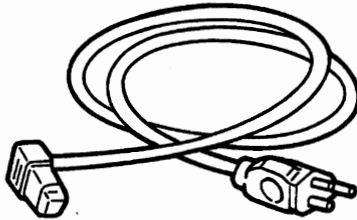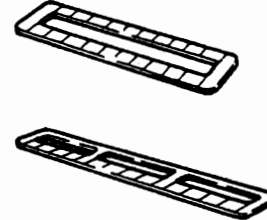
□ keyboard   or   or
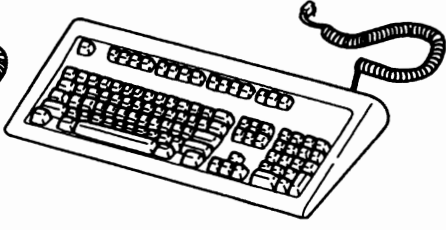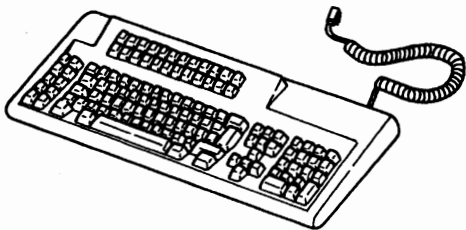
122/124-key Keyboard   104-key Keyboard[5]   IBM Enhanced Keyboard

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[3] Either of the two display stands is available depending upon the countries as shown:

Stand All the countries except European, Middle East, and African countries
Lift-stand European, Middle East, and African countries

[4] The security keys are not be inserted as shown. Detach one key and store it in a safe place.

[5] The 104-key keyboard is available in the U.S. and Canada.

Attach RID (Repair Identification) Tags

┌─── **Note to the reader** ──┐

If the display station is used in the U.S., disregard this section and go directly to "Attach Logic Element to Display Element" on page 1-5.

└───┘

1 Tear off the tags from the bottom of the logic element.
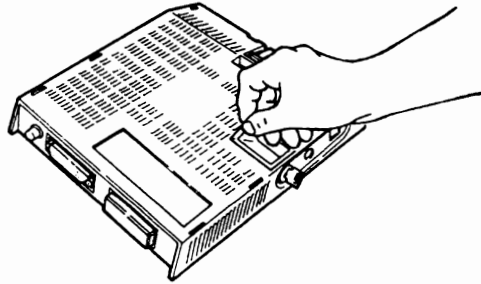
2 Turn the keyboard upside down.
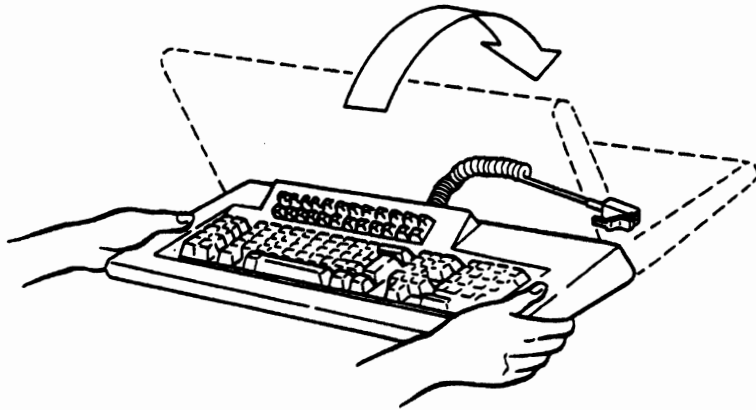
3 Peel off the tags and place one on each of the parts as shown.
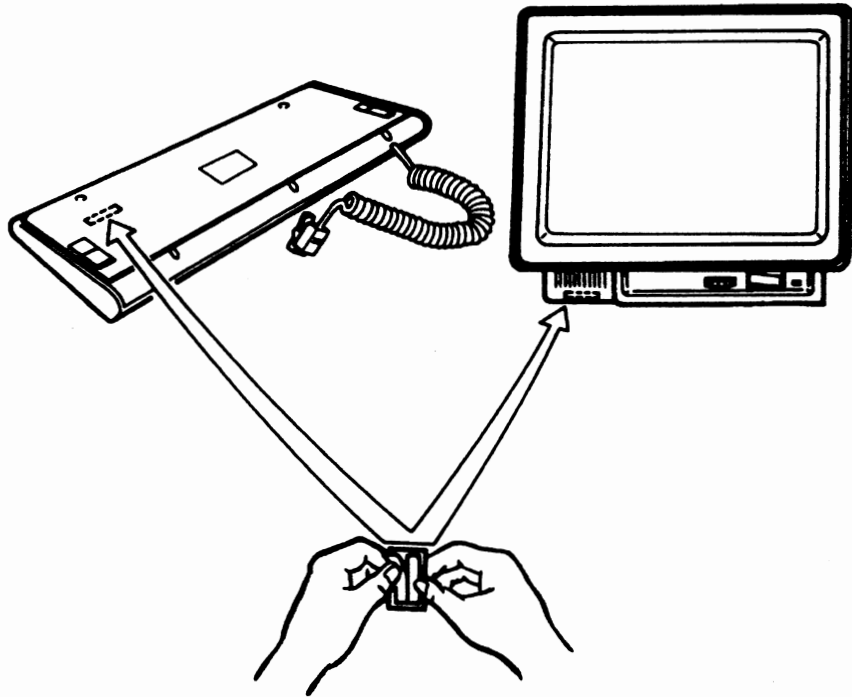
┌─ **Important** ───┐
│   │
│ If you do not attach the tags, there may be a substantial delay in obtaining │
│ service due to the time required by IBM to determine the unit's mainte- │
│ nance status.   │
│   │
└──┘

Attach Logic Element to Display Element

1 Turn the display element upside down so that the screen faces you.
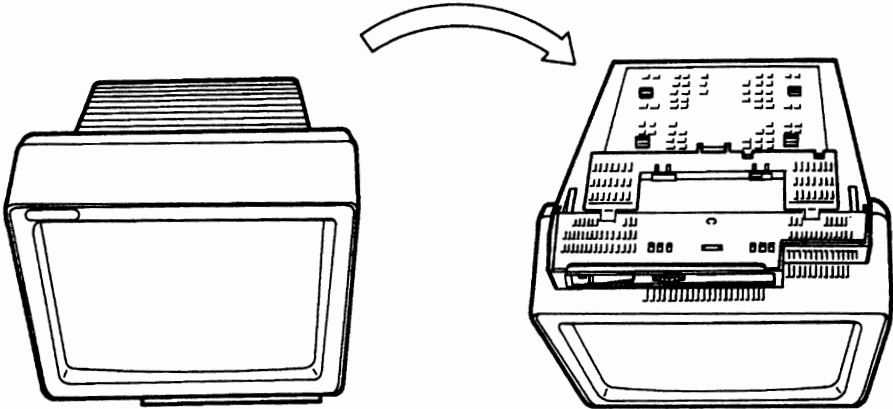
2 Locate the four slots **1** of the display element.
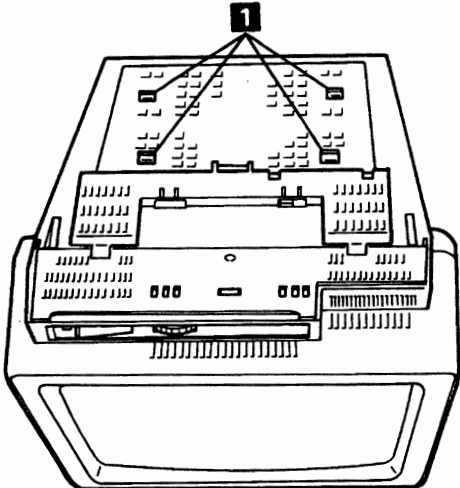
3 Locate the four hooks **2** of the logic element.
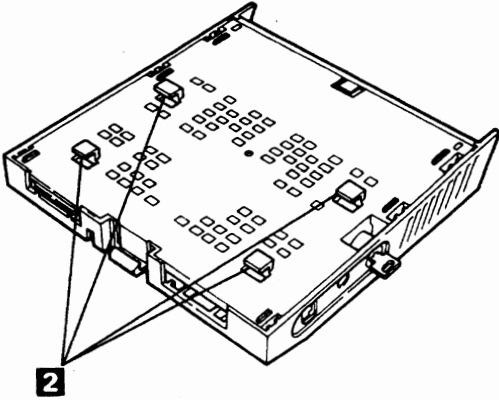
4 Insert the four hooks of the logic element into the four slots of the display element.
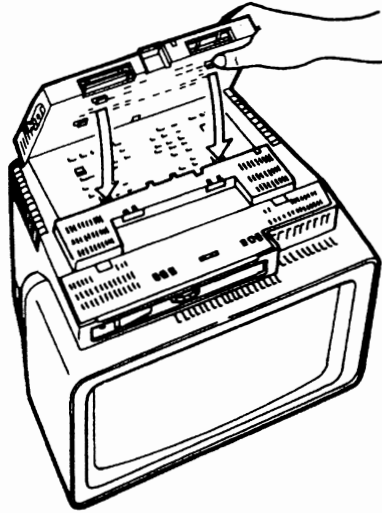
5 While holding the top edge of the front side of the display element, pull the logic element toward you until the logic element snaps into place.

6 Make sure the logic element is locked onto the display element by moving the logic element forward and backward.
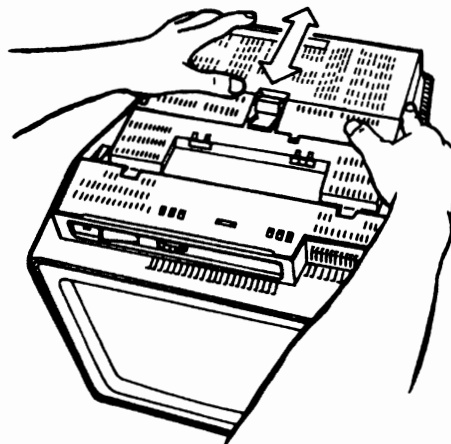
Attach Stand to Display Element

┌─ **Note to the reader** ───┐

If you are attaching the lift-stand, go to "Attach Lift-stand to Display Element" on page 1-10.

└──┘
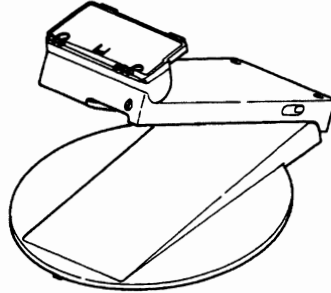
1 Locate the six slots **3** of the display element.
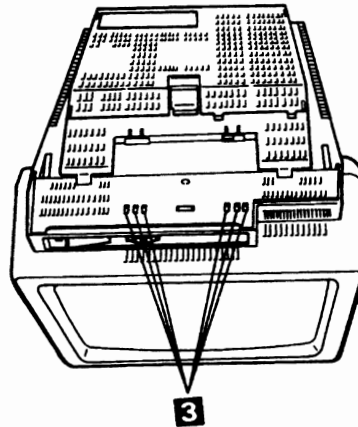
2 Locate the six hooks **4** of the stand.
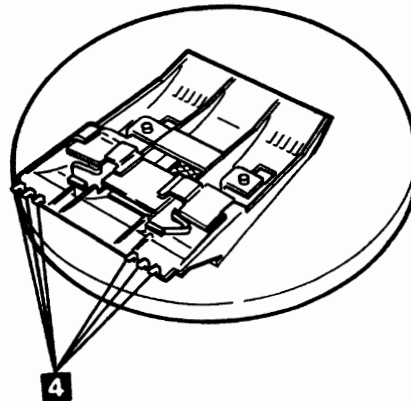
3 Insert the six hooks of the stand into the six slots of the display element.
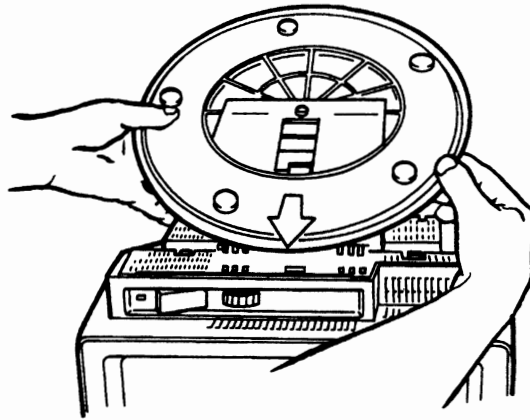
4 Push the edge of the stand down.
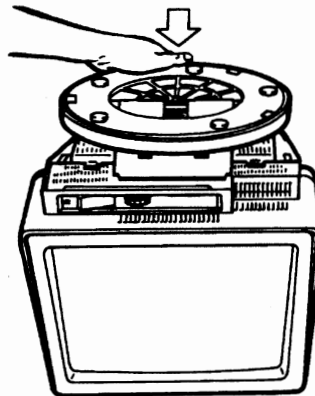
5 Make sure the stand is locked onto the display element by moving the stand forward and backward.
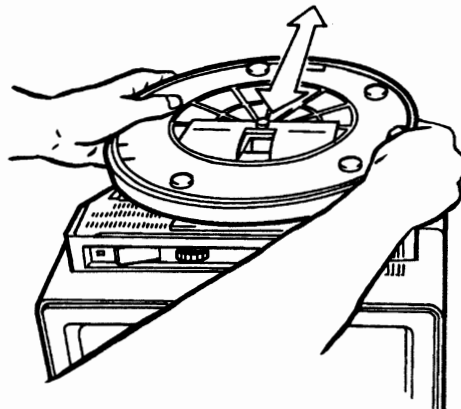
6 Make sure that the arrow mark at the bottom of the stand is indicating the front of the display element. Turn the display element right side up.
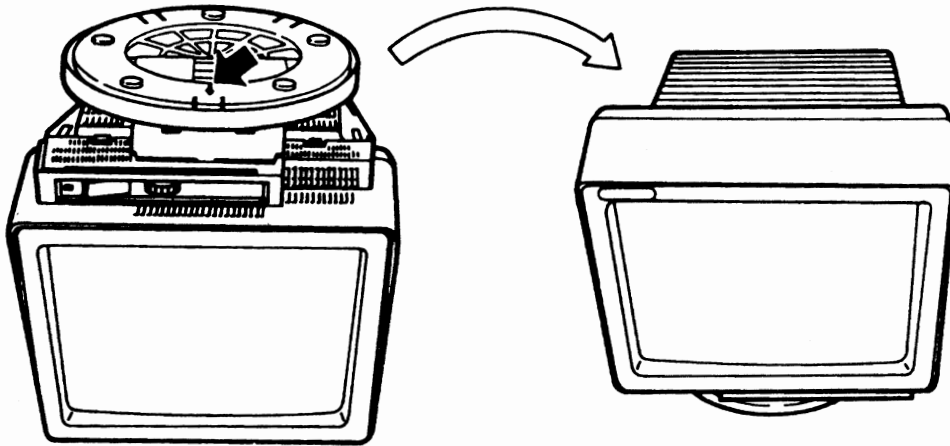
7 Adjust the viewing angle by rotating and tilting the display element.
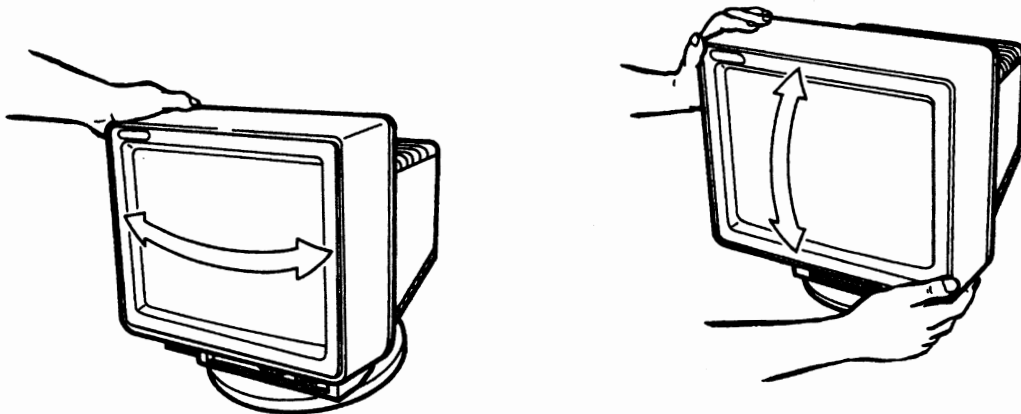
8 Go to "Connect Keyboard Cable" on page 1-14.

Attach Lift-stand to Display Element

1 Lock the lock-lever of the lift-stand.
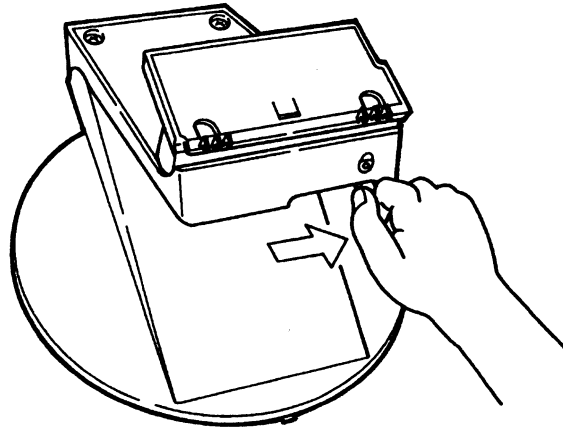
2 Locate the six slots ■3 of the display element.
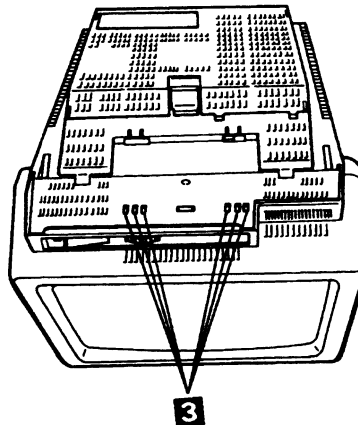
3 Locate the six hooks ■4 of the stand.
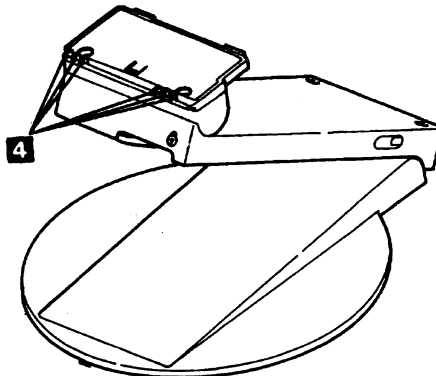
4 Insert the six hooks of the stand into the six slots of the display element and place the stand on the display element. You should hear a click sound when the stand is locked onto the display element.
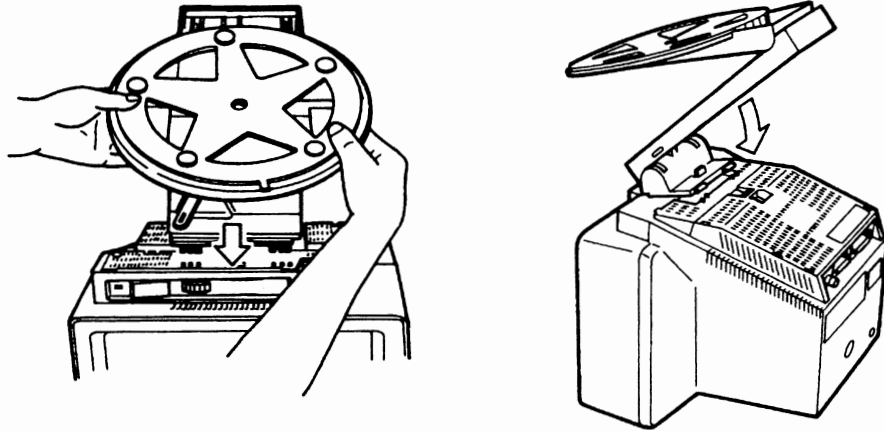
5 Make sure the stand is locked onto the display element by moving the stand forward and backward.
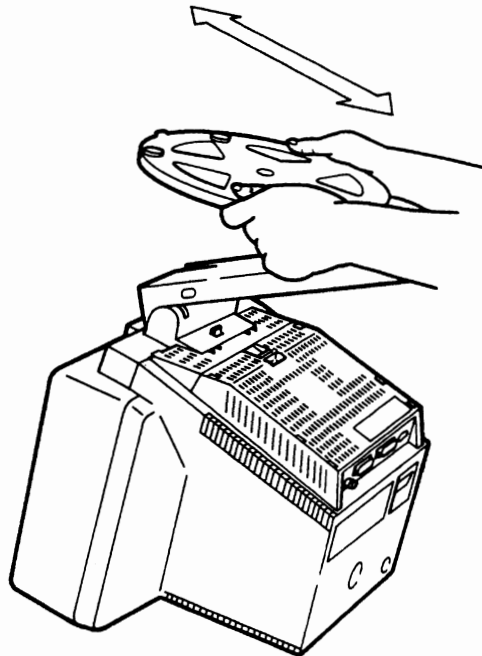
6 Make sure that the notch at the bottom of the stand is indicating the front of the display element. Turn the display element right side up.
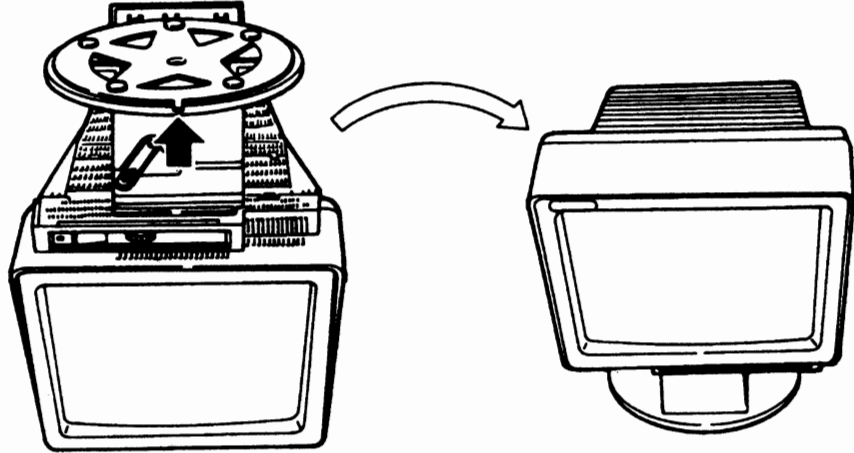
7 Release the lock-lever of the lift-stand.

CAUTION:
To avoid pinching your fingers in the lift-stand, do not press down the display element while the other hand is holding the stand.
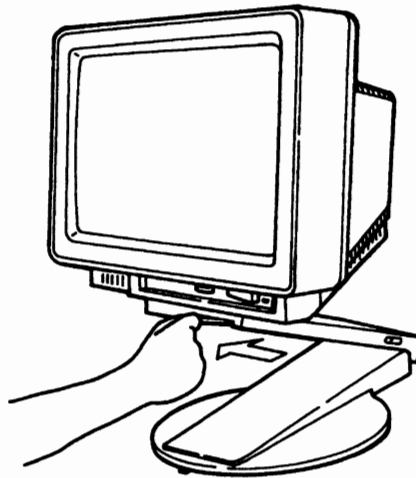
8 Adjust the height and viewing angle of the display element.

CAUTION:
When you adjust the height of the display element, be careful not to pinch your fingers.
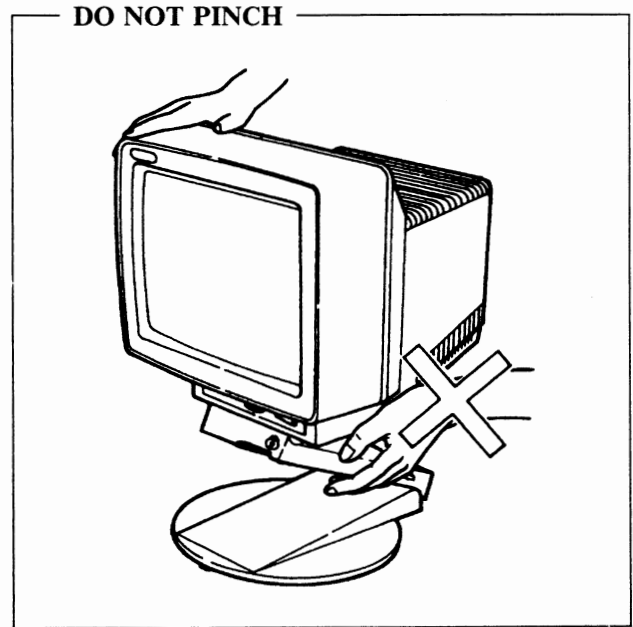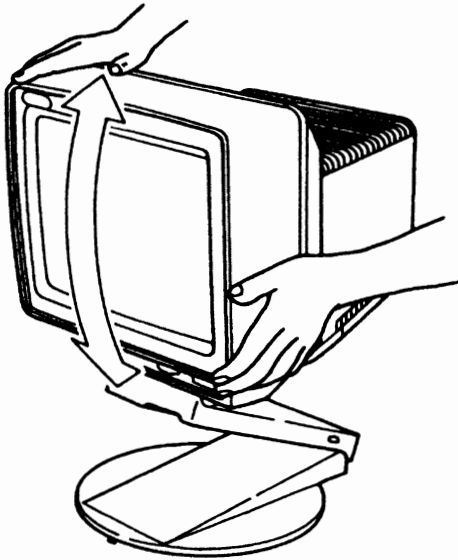
9 Lock the lock-lever of the lift-stand.
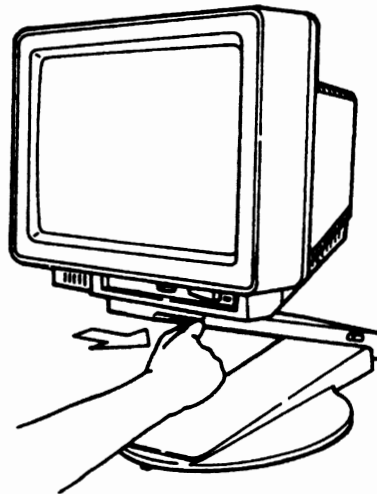
Connect Keyboard Cable

1 Place the keyboard in front of the display element.

> **Important**
>
> If you have a lift-stand attached to the display element and you want to move it to place the keyboard in front of the display station, slide the stand forward or backward by holding the bottom of the display element with two hands.
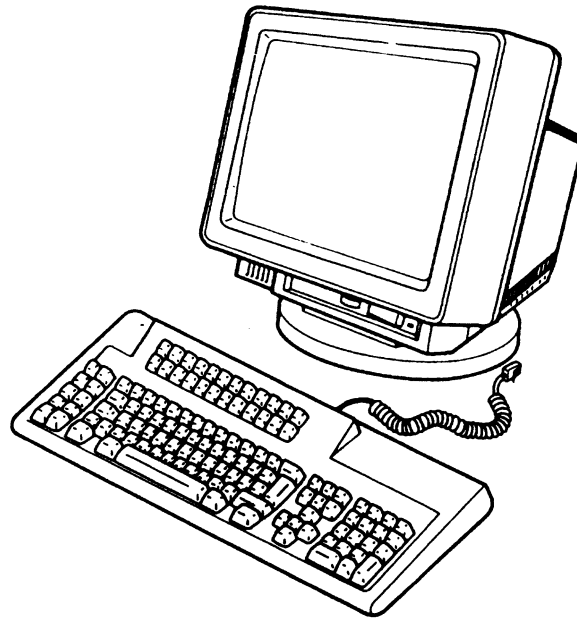
2 Insert the keyboard cable into the logic element.
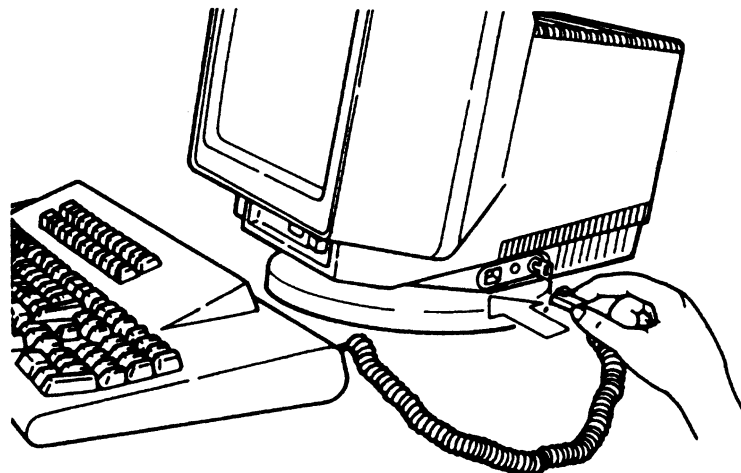
Personalize Display Station

1 Adjust the keyboard angle.
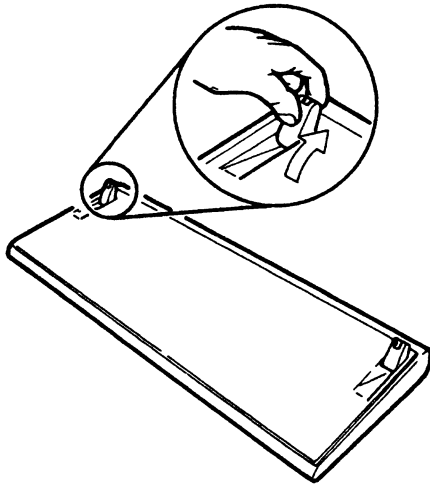
122/124-key and IBM Enhanced keyboard
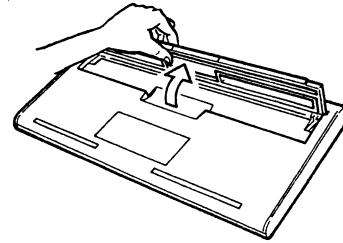
104-key keyboard (High Position)
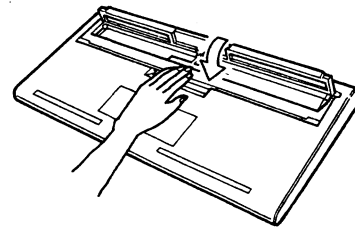
104-key keyboard (Low Position)

2 Place the keyboard overlay that fits with your keyboard function keys and keep the other keyboard overlay for possible later use.
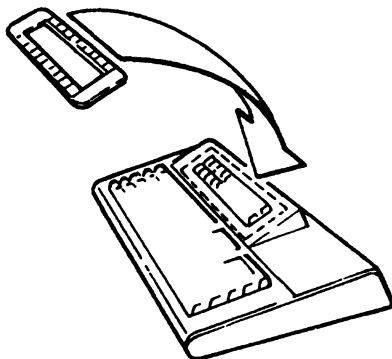
104/122/124-key keyboard
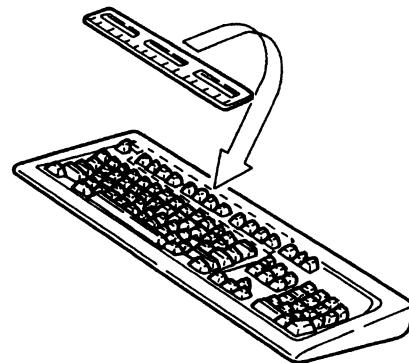
IBM Enhanced keyboard

Apply Power to Display Station

1 Make sure the power switch is set to Off (O), or the power button is in the raised position (off position).
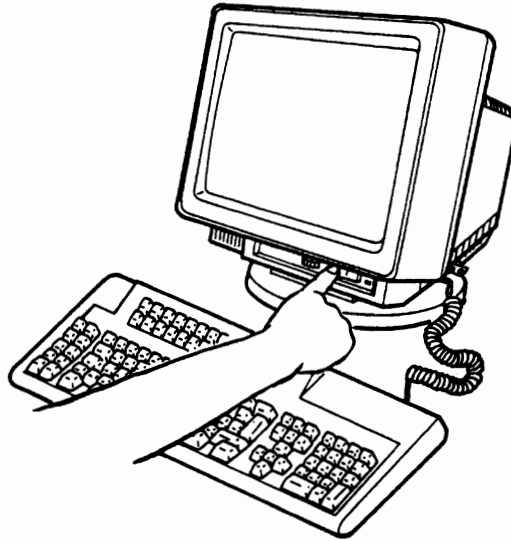
2 Insert the power cord into the display element as shown.
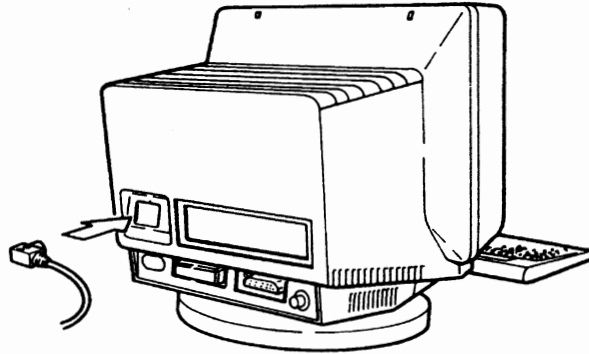
DANGER

An incorrectly wired outlet or plug can place hazardous voltage on accessible metal parts of this display station. The power cord and plug (when supplied) on your display station have been approved for use with this display station and meet the necessary testing laboratory/test house standards. For your safety, the power cord and plug must be connected to a correctly wired and grounded outlet. The customer is responsible for the outlet and plug wiring.

If it becomes necessary to change the power cord or plug, or if the outlet is incorrectly wired, have the change made by a qualified electrician according to local or national code. A new power cord may be ordered from your IBM marketing representative.

3 Plug the power cord into an electrical outlet.
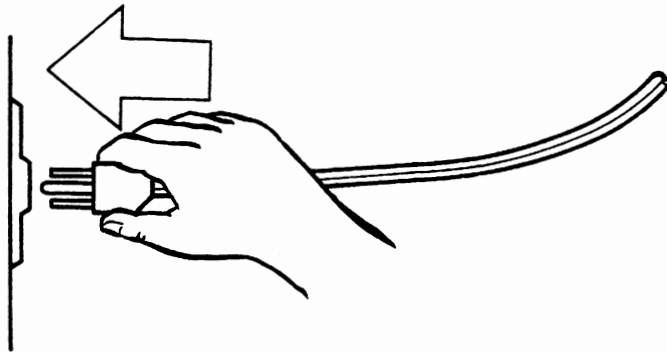
Notice for Customers in Chicago, Illinois

Two different lengths of power cords, 1.8 m (5.9 ft) and 2.8 m (9.2 ft), are shipped with the display station. Use the 1.8 m (5.9 ft) length power cord.

4 Make sure the security key is turned clockwise.
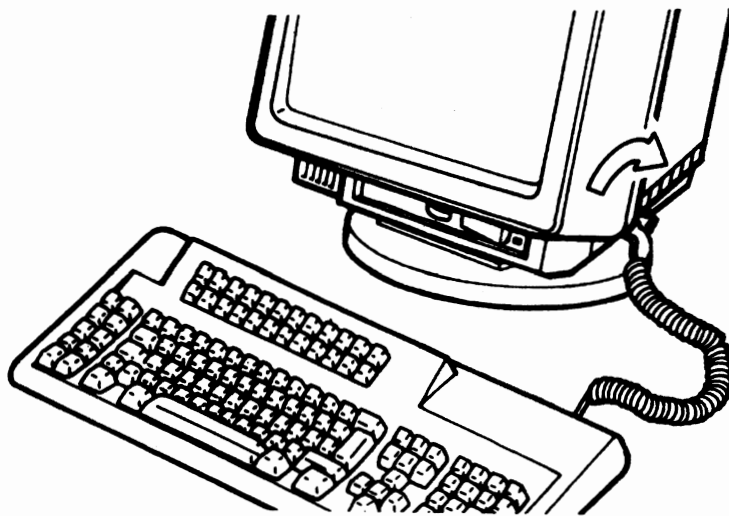
Adjust Screen Brightness

1 Press and hold the space bar, and set the power switch to On. The power-on light should turn on, and you will hear the audible alarm.

> **Important**
>
> Hold the space bar down until the offline setup panel appears.

"Offline Setup" panel appears on the screen.

```
┌─────────────────────────────────────────────────────────────┐
│                        Offline Setup                          │
├─────────────────────────────────────────────────────────────┤
│ Move cursor to desired selection and press ENTER.             │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```
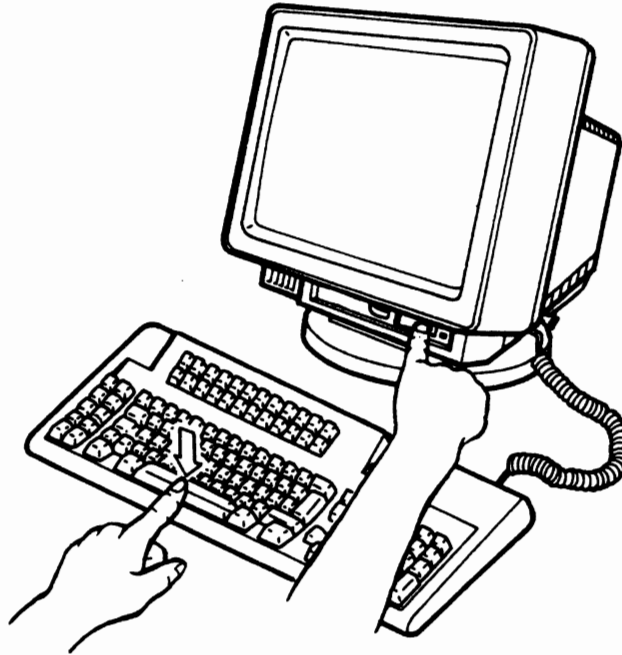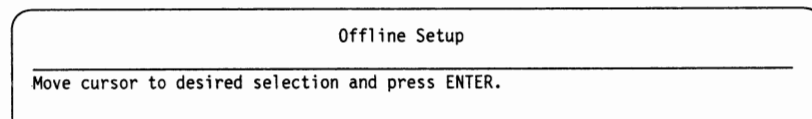
Notes:

a. A quick power-off and power-on sequence may cause the machine not to function correctly. If this happens, set the power switch to Off, wait a few seconds, then set it back to On.

b. If you have any problem in setting up the display station, see Chapter 5, "Problem Solving" on page 5-1.

2 Turn this knob right to brighten or left to darken the screen.
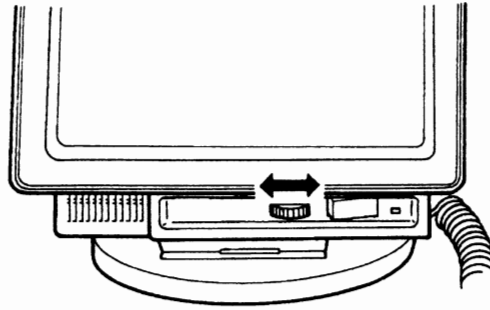
3 Set the power switch to Off.
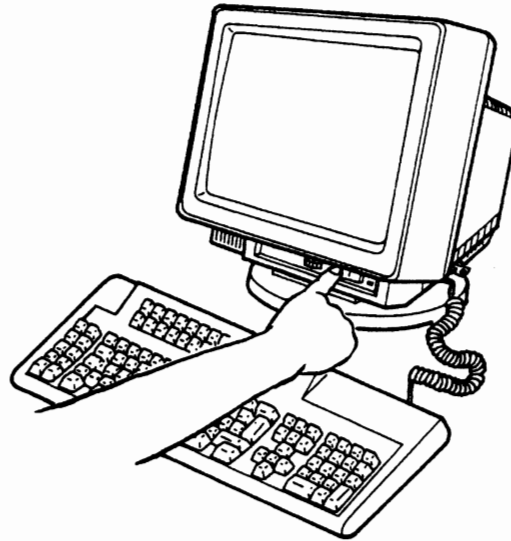
Connect Display Station to Host System

1 Make sure that the power switch is set to Off.
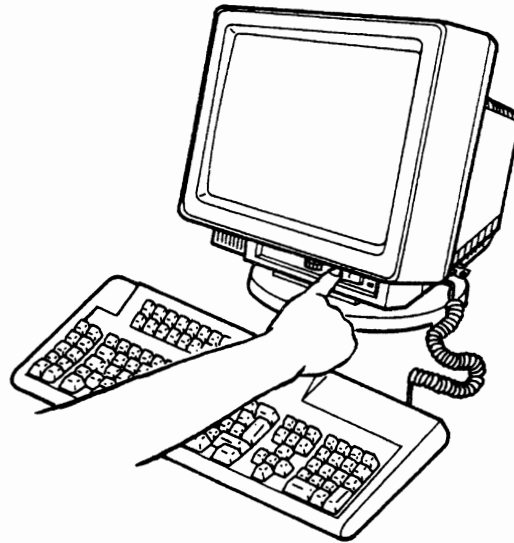
2 Unplug the power cord from the electrical outlet.
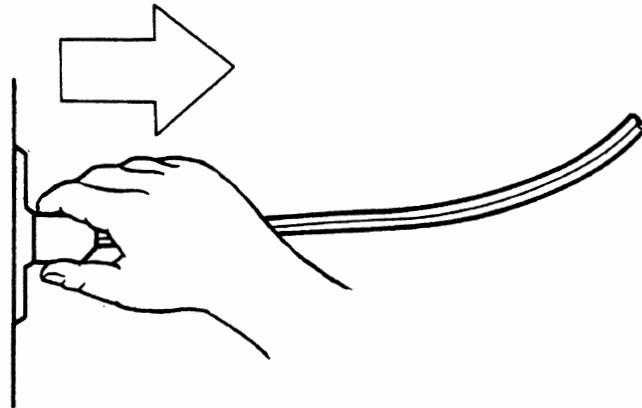
DANGER

To avoid the possibility of electrical shock, make certain that the
display station is unplugged from the electrical outlet before connecting
the communication cable between the display station and host system, or
the workstation controller.

3 Insert the communication cable into the connector of the logic element, then
turn it clockwise.
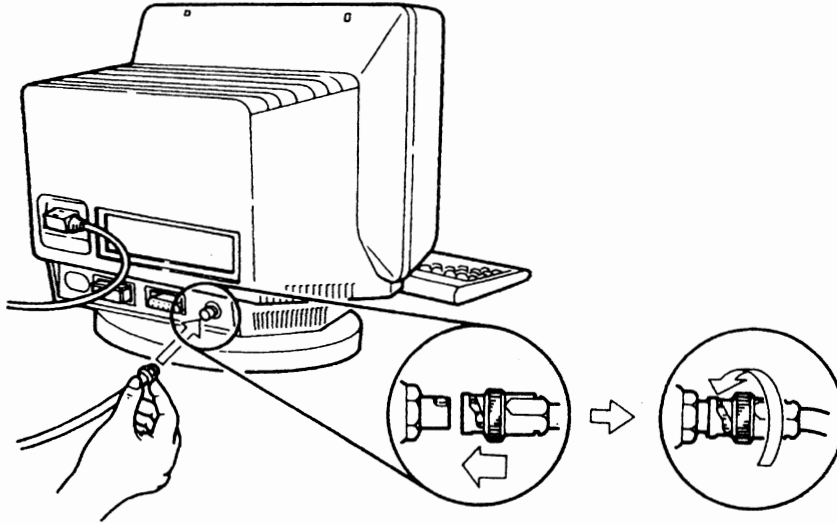
4 Plug the power cord into an electrical outlet.
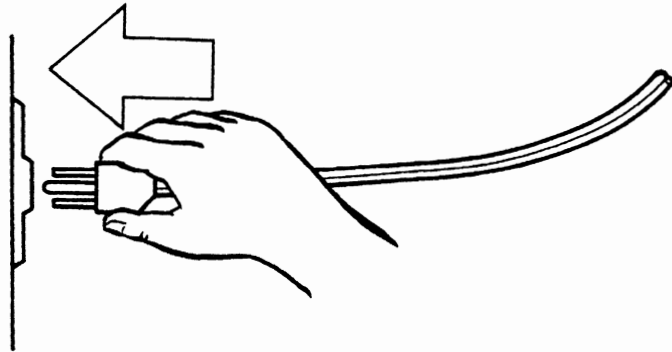
5 Set the power switch to On. The power-on light will turn on, and you will hear the audible alarm.
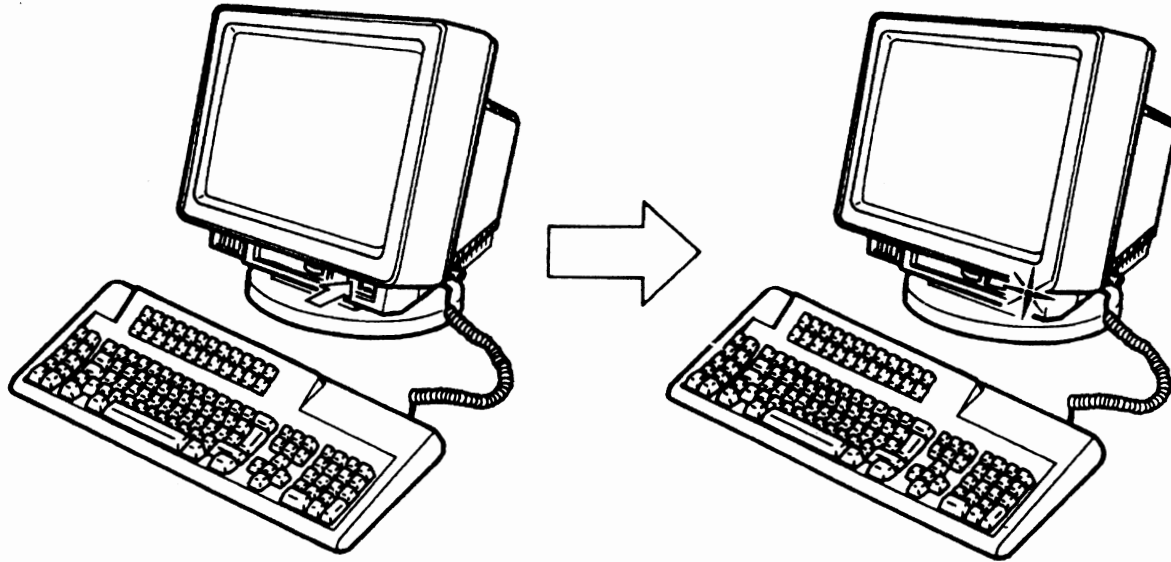
6 Approximately 30 seconds later, check that one of the symbols: 田, N, or S appears on the bottom left of the screen.
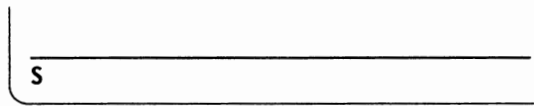
Note: If 田, N, or S does not appear, call the system coordinator for the control unit or host system for assistance.

SETUP OF YOUR DISPLAY STATION IS NOW COMPLETE.

If auxiliary devices are to be connected to this display station, go to the next page.

Note: You can define various display station characteristics using the setup panels. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1.

Connect Printer, Mouse, Plotter, and Tablet

Note: The product information for the auxiliary devices can be obtained from your sales representatives.

1 Make sure the power switches of the display station and the auxiliary devices are set to Off.
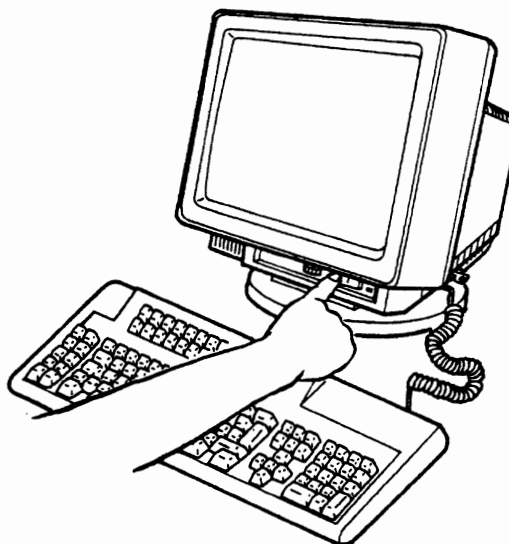
DANGER

> To avoid the possibility of electrical shock, make certain the display station and the attaching auxiliary devices are both unplugged from the electrical outlet before attaching the auxiliary devices to the display station.

2 Unplug the power cord from the electrical outlet.
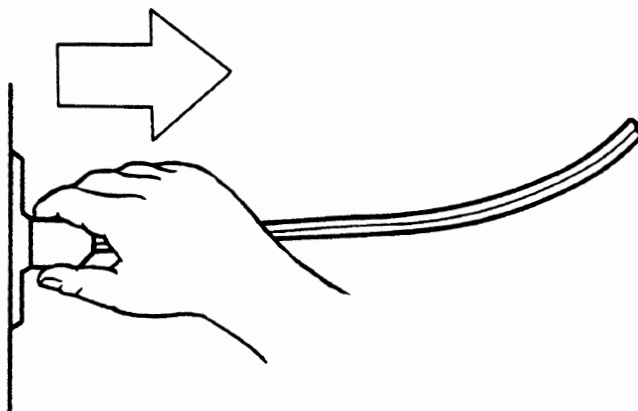
Note: For setup and operation of your auxiliary devices, refer to the device instruction manuals.

3 If you connect the printer, insert the cable of the printer into the logic element, then tighten the screws.

Note: When inserting, check that the shape of both connecters match correctly.
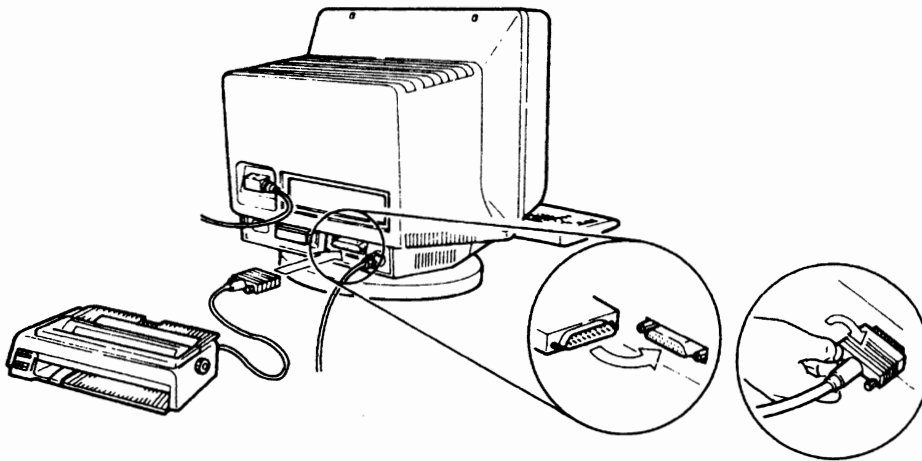
4 If you connect the mouse, insert the cable of the mouse into the logic element.

Note: When inserting, check that the shape of both connecters match correctly.
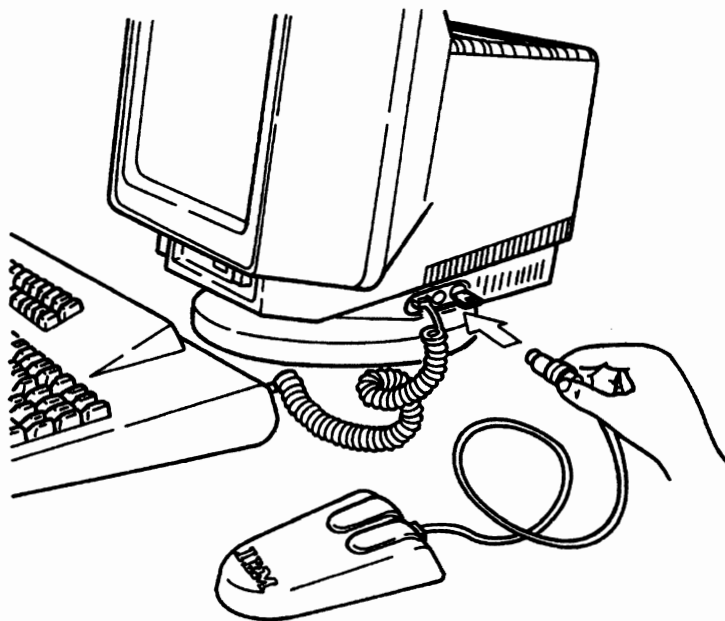
5 If you connect the plotter or tablet, remove the connector cap of the display station.

Note: Keep the cap and reinstall it in reverse sequence when the connected device is removed.
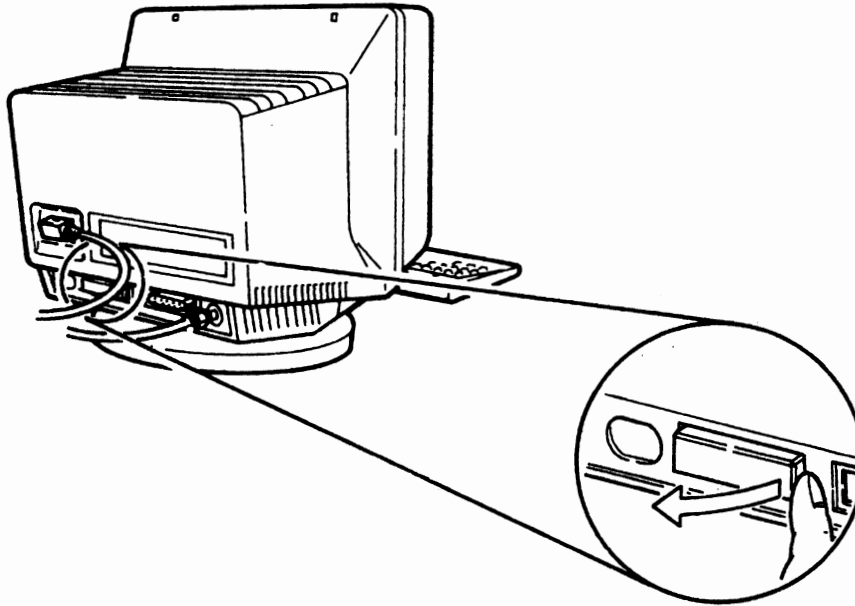
CAUTION:
To avoid the electrical trouble, make sure that the cap is installed when the plotter or tablet is not connected.

6 If you connect the plotter, insert the cable of the plotter into the logic element, then tighten the screws.

Note: When inserting, check that the shape of both connecters match correctly.
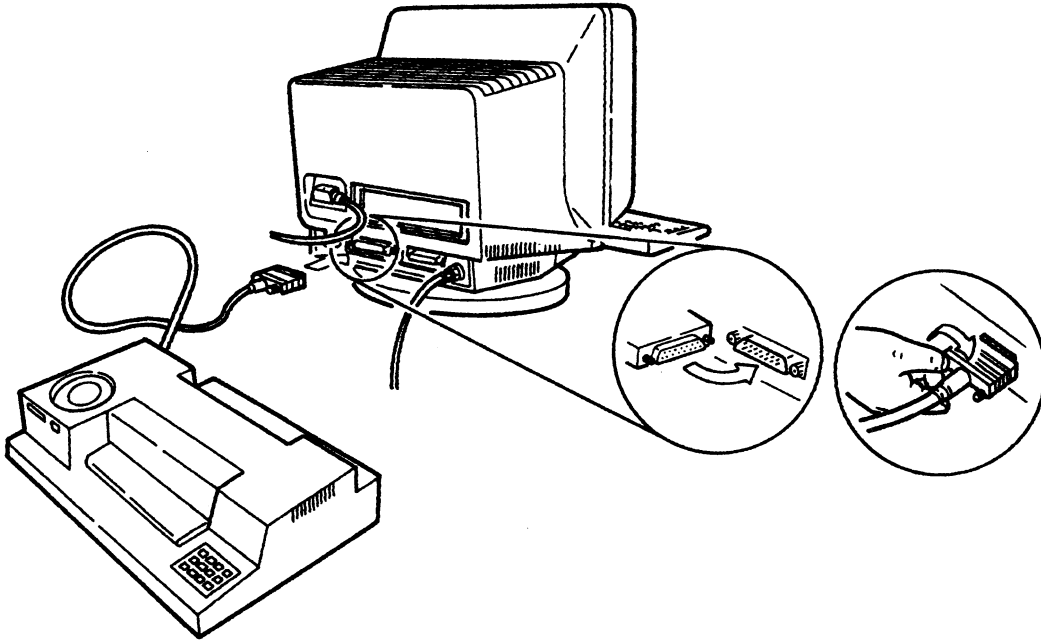
7 If you connect the tablet, insert the cable of the tablet into the logic element.

Note: When inserting, check that the shape of both connecters match correctly.
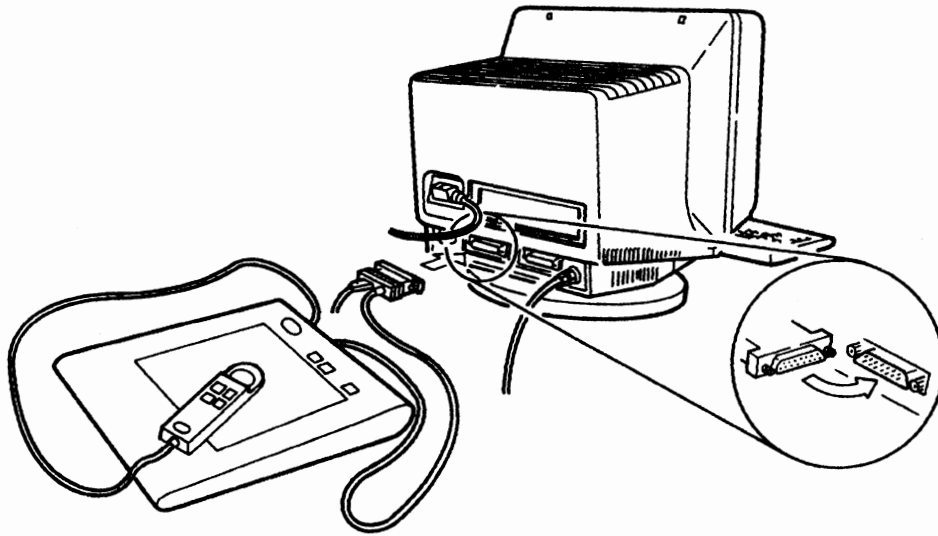
8 Plug the power cords of the display station and auxiliary device into an electrical outlet.
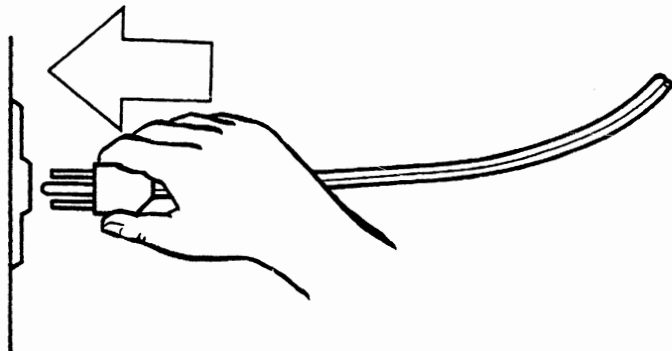
9 Set the power switches of the auxiliary device and the display station to On.
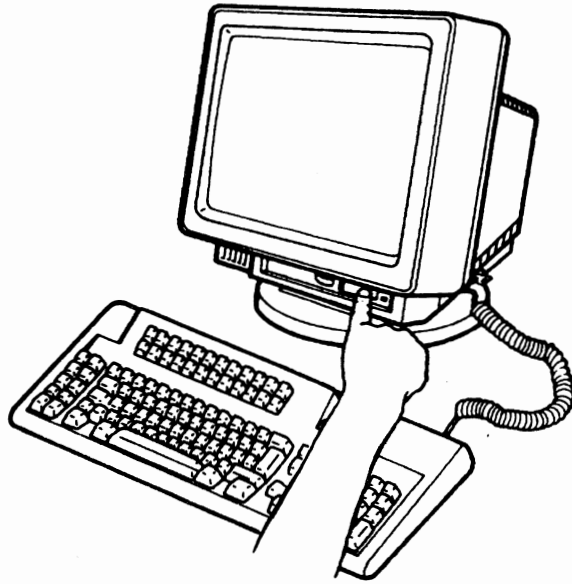
SETUP OF YOUR DISPLAY STATION IS NOW COMPLETE.

Note: To use the auxiliary devices, you need to define the devices correctly in the setup panel. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1.

Chapter 2. Operations

This chapter describes the display station operations. Some example operations are provided to help you become familiar with each display station function.

If you encounter a problem during the operation of the display station, refer to Chapter 5, "Problem Solving" on page 5-1.

The following chart leads you to reference sections which will assist task performance. If you cannot find the appropriate description of the job that you are performing, see the table of contents or the index.

Table 2-1 (Page 1 of 2). Task Reference Table

When you are...	You should...	Refer to...	On page...
Starting operations for the first time	Power on and adjust the display station for your operational convenience.	*Powering-On and Personalizing Display Station*	2-3
	Learn about the host sessions and the display station.	*Sessions and Windows*	2-6
	Define sessions to establish the host session.	*Starting Sessions*	2-9
Changing **window** characteristics: • size (border) • position • jumping order (screen profile)	Follow different operational procedures for each characteristic change.	*Personalizing Windows*	2-14
Changing **colors**: • window background • window border • notepad • base color	Follow different operational procedures for each color change.	*Changing Colors and Highlighting*	2-21
• rule • graphic cursor	Change the appropriate setup value in the display setup panels.	*Appendix A, Setup Mode and Printer Control Operations*	A-1
• print trim border • print colors	Change the appropriate setup value in the printer setup panels.	*Appendix A, Setup Mode and Printer Control Operations*	A-1
Copying a part of the display contents to another part	Follow the instructions given.	*Copying Screen Contents*	2-27
Using **mouse, plotter,** or **tablet**	Make sure that the appropriate values are set on the setup panels.	*Using Mouse, Plotter, and Tablet*	2-30
Printing screen contents to a printer	Follow the instructions given.	*Printing Screen Contents*	2-32
Recording or replaying the keyboard keystrokes	Follow the instructions given.	*Recording and Playing Keystrokes*	2-36
Editing or entering texts	Be helped by the Entry Assist function.	*Making Entry and Edit More Effective*	2-43

Table 2-1 (Page 2 of 2). Task Reference Table

When you are...	You should...	Refer to...	On page...
Connecting your display station to a host system through **X.21/X.25** network	Follow the connection procedures.	*Operating in X.21/X.25 Network*	2-47
Checking the **response time** of the host system.	Follow the instructions given.	*Checking Response Time*	2-49
Encountering a **problem** during the display station operation	Check the messages that appear in the operator information area, if you do not see an obvious display station hardware problem.	*Chapter 3, Operator Messages*	3-1
	Follow the problem solving procedures, if the messages that appear in the operator information area do not help.	*Chapter 5, Problem Solving*	5-1
Customizing **control unit** (display controller)	Select "Customize display controller" in the setup panel.	*Appendix A, Setup Mode and Printer Control Operations*	A-1

Powering-On and Personalizing Display Station

The following steps show how to start operations with the display station.

1. Unlock the security key **1** by turning it clockwise.

   The security key prevents the entry, change, or viewing of the display station's data.

2. Turn the power switch **2** to On.

   This switch applies the power to the display station and the Power-on light **3** comes on.

Note: A quick power Off/On sequence may cause problems with the display station. After powering off, you should wait a few seconds before you power on again.
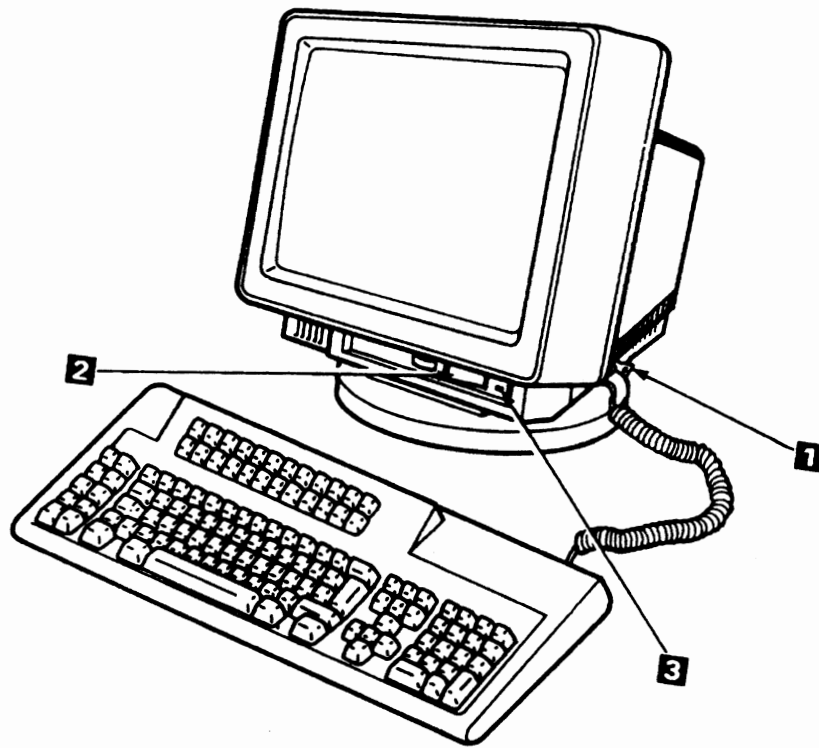
Figure 2-1. IBM InfoWindow 3472

Screen Brightness

The brightness control knob adjusts the brightness of the characters on the screen. The characters on the screen get brighter when you turn this knob right.
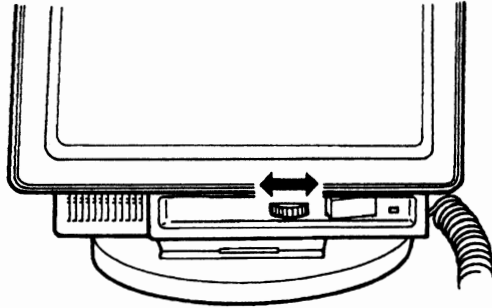
Display Viewing Angle

You can adjust the viewing angle by rotating or tilting the display element.
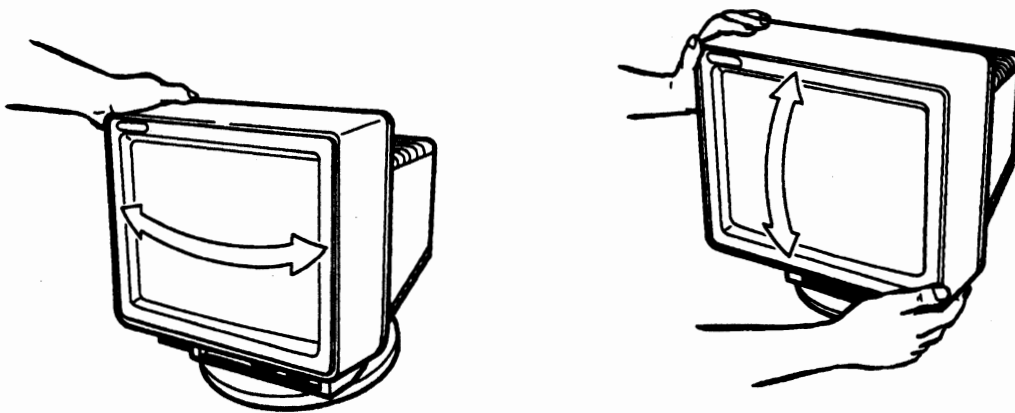
Figure   2-2. Viewing Angle Adjustment

If the lift-stand is attached, the display element can be lifted up or down.

Release lock-lever	Adjust viewing angle	Lock lock-lever
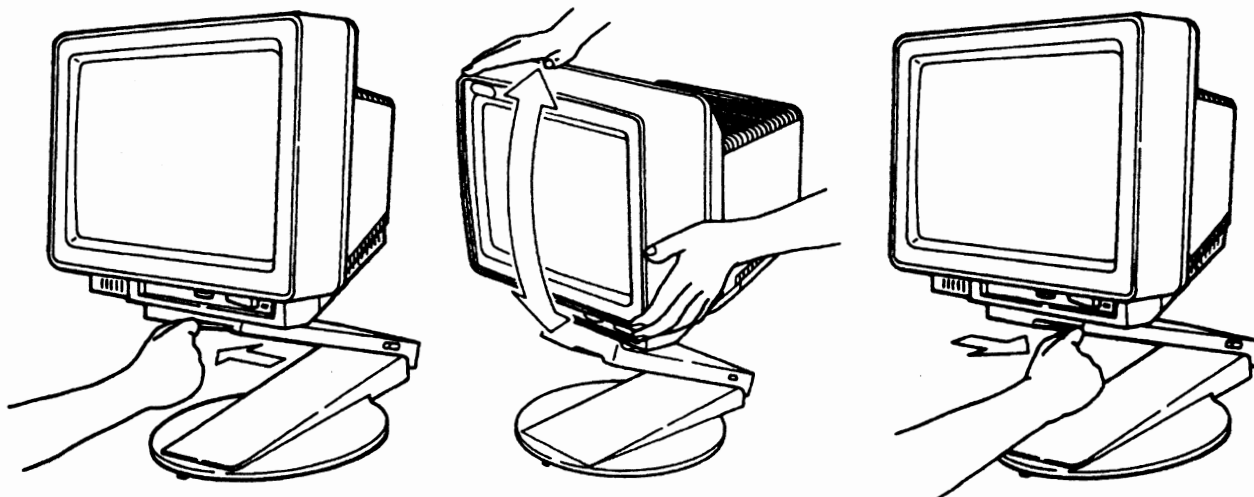
CAUTION:
When you adjust the height of the display element, be careful not to pinch your fingers.

Keyboard Slope Adjustment

You can adjust the keyboard slope by:

1. Lifting the back of the keyboard.
2. Pulling out the leg edges from the keyboard.
3. Pushing out the legs to lock them in place.

When you lock both legs underneath the keyboard, the keyboard sits flat.

122/124-key and IBM Enhanced keyboards
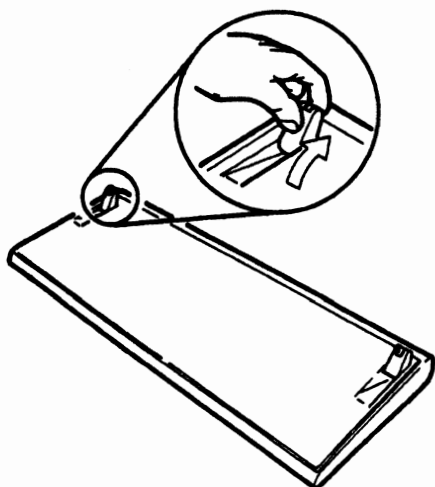
104-key keyboard (high position)
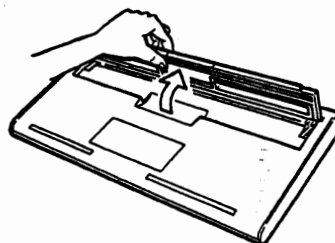
104-key keyboard (low position)
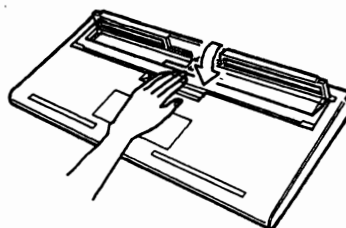
Sessions and Windows

The display station can simultaneously communicate with five 3270 host sessions and one ASCII session. One graphic session (for host graphics applications) and one printer session (for host initiated printing on your printer) can be assigned to the 3270 sessions. You can have a blank screen area called "Notepad" where you can jot down short memos or copy any display screen contents to. These sessions and notepad can be windowed (partially displayed) in the display screen at the same time. The following figure shows a conceptual view of the multi-session communications and screen windowing.
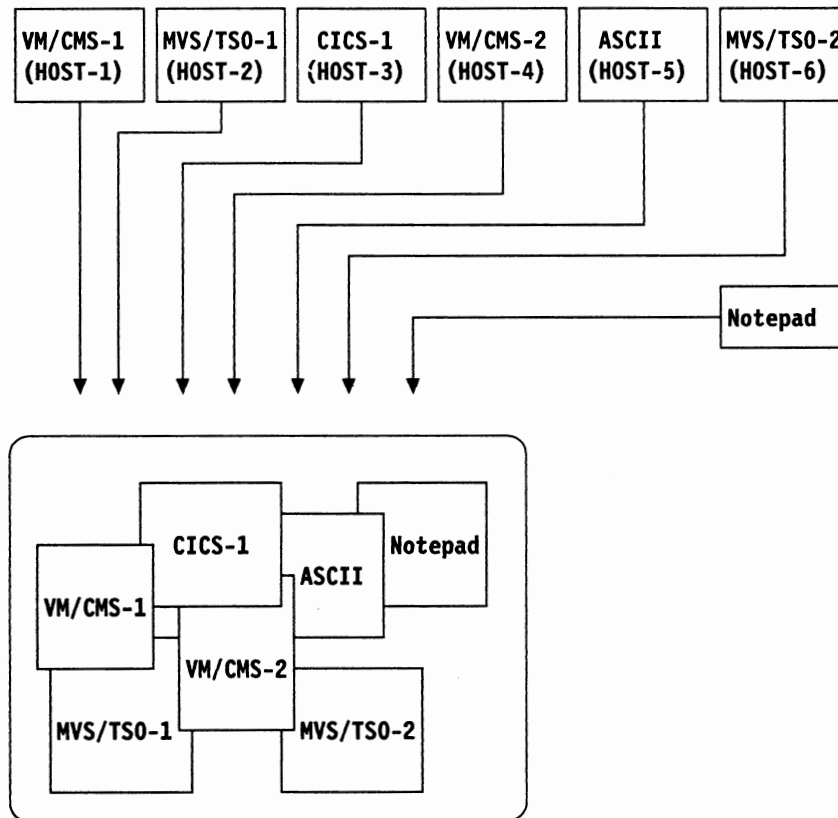
Figure   2-3. Sessions and Windows (Maximum Configuration)

Host Sessions

You can establish several 3270 host sessions concurrently. This is useful when you work with multiple 3270 host applications. By pressing the Jump key, you can change the session that you communicate with.

Note: Using multiple sessions requires the appropriate control unit customization and system generations. Refer to *IBM 3174 Subsystem Control Unit Customizing Guide* or *IBM 3274 Control Unit Customizing Guide*.

Graphics Session

You can use one of the host sessions for graphics applications. In the "Customization" panel, you need to specify the host session that you will use graphics applications in. Graphics applications are only allowed in one of the 3270 host sessions that you specify.

To assure the correct graphics session, you should note the following:

- The screen size should be either "24 x 80" or "32 x 80".

- The screen size should be the same as the session size.

- The host system generation should be appropriate for the screen size of the display station.

When the graphics session is set to "No" in setup mode, the first host session can use the PSS (Program Symbol Set: Host loaded special characters sets).

Notepad Session

The notepad is a blank screen area where you can type any characters, or copy any display contents from the other area on the display screen. When you type characters on the notepad, one of seven colors can be specified for each character. For each character, you can also specify display highlighting such as blink, underline, or reverse. Refer to "Changing Colors and Highlighting" on page 2-21 for specifying display highlighting operations.

The contents of the notepad are kept in the display station storage even when the display station is powered off.

The following figure shows one of the typical usages of the notepad. You can gather some parts of host-session screens using the copy function, and then print them on the local printer.

You wish to concentrate information on these windows.

You type the title "Error Record" and copy the information from the other windows.

After pressing the □↔□ key and placing the screen in enlarged mode, you print the screen contents on the local printer using the print function.
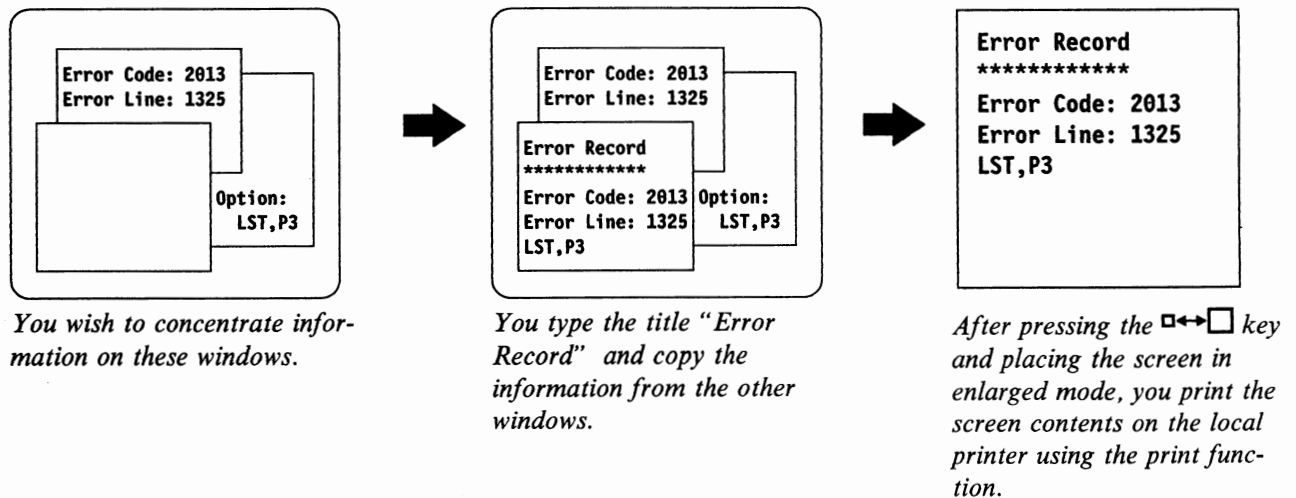
Refer to "Copying Screen Contents" on page 2-27 and "Printing Screen Contents" on page 2-32 for details of the copy and print functions.

ASCII Session

When the control unit supports the ASCII connection, the display station emulates an ASCII terminal.

Printer Session

One of the 3270 host sessions can be assigned as a printer session. When the printer session is defined, the host application program can submit a print request directly to the printer attached to the display station.

Starting Sessions

When the display station is delivered, one host session (with graphics capability) is already defined. If the control unit customization and the system generation is appropriate, you can start a host session without changing any display station characteristics (setup values). However, some characteristics may need to be changed for your system environment (for example "Numeric lock" handling). Appendix A, "Setup Mode and Printer Control Operations" on page A-1 describes the procedures to change the setup values.

You can use the following capabilities to improve each session operation:

- Windowing (page 2-14)
- Colors and Highlighting (page 2-21)
- Copying Screen Contents (page 2-27)
- Recording and Playing Keystrokes (page 2-36)
- Effective Text Entry and Edit (page 2-43)

To establish several sessions, the following example operation will help you to understand the flow.

Objective

The following items are concerned:

- Define "Session names" (multiple sessions) in the setup panel.

- Change "Session rows x columns", if necessary. (If you encounter a problem when you try to sign on to your host system, you may need to change this value. Ask your system coordinator for the appropriate value.)

- Change "Numeric lock", if necessary. (Most of the cases, this value should be left unchanged: "On".)

Example Operation

Environment: You are to establish three host sessions and one notepad. The graphics session is assigned to the second session. You know that the previous display station, which was attached to the same port as the 3472-G, had the screen (session) size of "32 x 80" (rows x columns). Your manager tells you that the numeric lock should be turned off for your system environment.

If a host session is in process (working with the host application program), you have to complete the session before going into the "Customization" panel.

1. When the display station is operational, press the SetUp key while holding down the Shift (Alt for the 104/122/124-key keyboard) key.

104/122/124-key keyboard   IBM Enhanced keyboard

You will see the "Online Setup" panel.

```
Online Setup

Move cursor to desired selection and press ENTER.
```
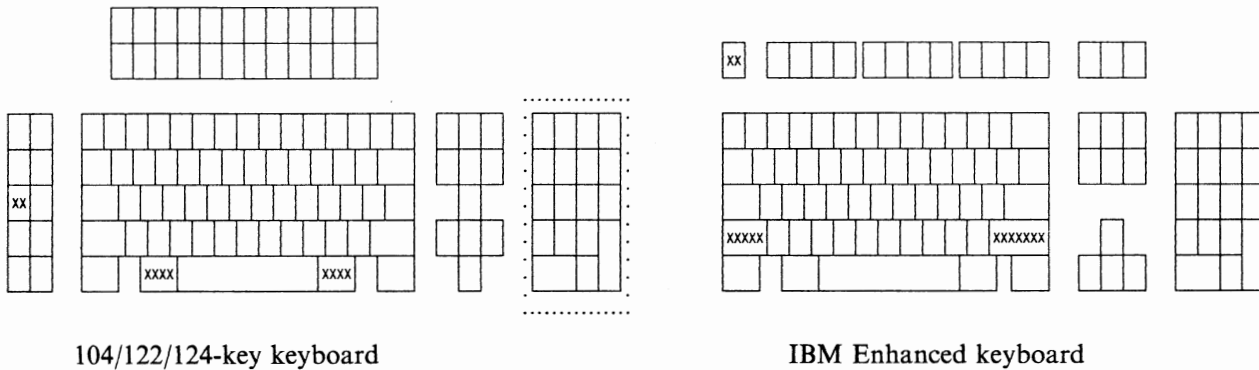
2. In the panel, select "Go to offline setup" by using the cursor move keys and by pressing the Enter key.

```
┌────────────────────────────────────────────────────────────────────────┐
│                            Online Setup                                  │
│                                                                          │
│ Move cursor to desired selection and press ENTER.                        │
│                                                                          │
│   Setup display                                                          │
│                                                                          │
│   Setup printer                                                          │
│                                                                          │
│   Setup window                                                           │
│                                                                          │
│   █Go to offline setup█                                                  │
│                                                                          │
│                                                                          │
│                                                                          │
│                                                                          │
│                                                                          │
│                                                                          │
│ F3=Exit                                                                  │
│ ──────────────────────────────────────────────────────────────────     │
│ SETUP                                                                    │
└────────────────────────────────────────────────────────────────────────┘
```

Note: When "Subsystem" is selected for "Model/Type" in "Customization" panel, "Setup printer" does not appear.

You should see the following warning message for host session disconnection: "Sessions will be terminated, press Enter to continue or any other key to quit.".

3. Press the Enter key to continue. The "Offline Setup" panel should appear.

```
┌────────────────────────────────────────────────────────────────────────┐
│                            Offline Setup                                 │
│                                                                          │
│ Move cursor to desired selection and press ENTER.                        │
│                                                                          │
```

4. In the panel, select "Customize display station" by using the cursor move keys and by pressing the Enter key.

```
┌────────────────────────────────────────────────────────────────────────┐
│                            Offline Setup                                 │
│                                                                          │
│ Move cursor to desired selection and press ENTER.                        │
│                                                                          │
│   █Customize display station█                                           │
│                                                                          │
│   Update serial number                                                   │
│                                                                          │
│   Set extended vital product data                                        │
│                                                                          │
│   Test display station                                                   │
│                                                                          │
│   Change keyboard layout                                                 │
│                                                                          │
│   Customize display controller                                           │
│                                                                          │
│                                                                          │
│ F3=Exit                                                                  │
│ ──────────────────────────────────────────────────────────────────     │
│ SETUP                                                                    │
└────────────────────────────────────────────────────────────────────────┘
```

You will see the "Customization" panel.

```
                          Customization                    More:  +

Move cursor to desired choice, then press SPACE BAR to select.

    Keyboard layout  . . . . . .  [Standard]  User1      User2      User3

    Numeric lock . . . . . . . .  Yes         No

    Underscore style . . . . . .  - - -       —

    CECP . . . . . . . . . . . .  Yes         No

    VM clear . . . . . . . . . .  Yes         No




 F3=Exit                F8=Forward     F11=Reset values     F12=Cancel
 ─────────────────────────────────────────────────────────────────────
 SETUP
```

5. Move the reverse block to "No" of "Numeric lock" using the cursor move keys and press the Space Bar to select.

6. Press the F8 key twice to skip to the panel with "Session names".

7. You enter "B" for "Short name" of "Host2", "C" for "Host3", and "N" for "Notepad". The default long names "HOST2", "HOST3", and "NOTEPAD" appear automatically.

```
                          Customization                    More: -+

Move cursor to desired field.  Type the requested information or
press SPACE BAR to select choice.

    Session names              Short Name  Long Name
                               A-Z         A-Z 0-9
        Host1 . . . . . . . . .  [A]       HOST1___
        Host2 . . . . . . . . .  B         HOST2___
        Host3 . . . . . . . . .  C         HOST3___
        Host4 . . . . . . . . .  _         _____
        Host5 . . . . . . . . .  _         _____

        AEA host . . . . . . . .  _         _____

        Notepad . . . . . . . .  N         NOTEPAD_

    Graphics session . . . . . .  None  A    B    C

    Printer session  . . . . . .  None  A    B    C

 F3=Exit    F7=Backward    F8=Forward    F11=Reset values    F12=Cancel
 ─────────────────────────────────────────────────────────────────────
 SETUP
```

Note: The short and long names that are defined in this panel appear at the top left boundary of the window (window border) when the session is windowed.

8. Move the reverse block to "B" of "Graphics session" using the cursor move keys and press the Space Bar to select.

9. Press the F8 key to go to the next screen. You should see the panel for "Session rows x columns" selection.

```
┌──────────────────────────────────────────────────────────────────────────┐
│                            Customization                        More: -+   │
│ ────────────────────────────────────────────────────────────────────────  │
│ Move cursor to desired choice, then press SPACE BAR to select.             │
│                                                                            │
│    Session rows x columns                                                  │
│       A-HOST1  . . . . . . . . .   24 x 80    32 x 80   43 x 80   27 x 132  │
│       B-HOST2  . . . . . . . . .   24 x 80    32 x 80                       │
│       C-HOST3  . . . . . . . . .   24 x 80    32 x 80   43 x 80   27 x 132  │
│                                                                            │
│                                                                            │
│                                                                            │
│       N-NOTEPAD  . . . . . . . .   24 x 80    32 x 80   43 x 80   27 x 132  │
│                                                                            │
│                                                                            │
│                                                                            │
│                                                                            │
│                                                                            │
│                                                                            │
│                                                                            │
│  F3=Exit     F7=Backward    F8=Forward     F11=Reset values    F12=Cancel   │
│ ────────────────────────────────────────────────────────────────────────  │
│  SETUP                                                                      │
└──────────────────────────────────────────────────────────────────────────┘
```

10. Confirm that "Session rows x columns" is defined as "32 x 80". If needed, use the cursor move keys and press the Space Bar to select "32 x 80".

11. Press the F3 key to return to "Offline Setup" panel.

12. In "Offline Setup" panel, press the F3 key to exit from the setup mode.

Personalizing Windows

On the display screen, you can personalize the display of graphics and data using the window. In the following figure, the session with the display data "XXXXXX..." is partially displayed (windowed) on the screen. The window boundary is indicated with "window border" ▮ . At the top left corner the session name "A-HOST1" is displayed. "A" is "Short name" and "HOST1" is "Long name" that are defined in setup mode.

```
┌──────────────────────────────────────┐
│                                        │
│    ┌─A--HOST1──────────────────┐      │
│    │                            │      │
│    │ XXXXXXXXXXXXXXXXXXXXXXXX    │      │
│    │ XXXXXXXXXXXXXXXXXXXXXXXX    │      │
│    │ XXXXXXXXXXXXXXXXXXXXXXXX    │      │
│    │ XXXXXXXXXXXXXXXXXXXXXXXX    │      │
│    │ XXXXXXXXXXXXXXXXXXXXXXXX    │      │
│    │                            │      │
│    │             ▮              │      │
│    └────────────────────────────┘      │
│                                        │
│                                        │
└──────────────────────────────────────┘
```
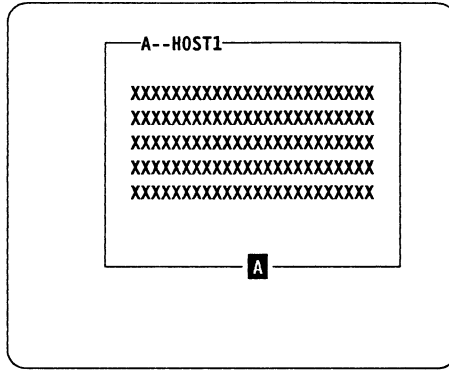
Using the window function is useful when you communicate with several host sessions concurrently. While you are working with one session, you can observe the status of the other sessions as the following figure.

```
┌─────────────────────────┐            ┌─────────────────────────┐
│           ┌──────────────┤            │           ┌──────────────┤
│           │Processing .  │            │           │Processing .  │
│ ┌─────────┤              │            │ ┌─────────┤Completed:    │
│ │Transaction Men         │   ┌──┐     │ │Transaction Men No Error Fou│
│ │***************│        │   │  │──►  │ │***************│Ready;    │
│ │Enter Name:....│        │   └──┘     │ │Enter Name:Dick│         │
│ │Number:    ....│        │            │ │Number:    ....│         │
│ │Date:      ....│        │            │ │Date:      ....│         │
│ └───────────────┘        │            │ └───────────────┘         │
└─────────────────────────┘            └─────────────────────────┘
```
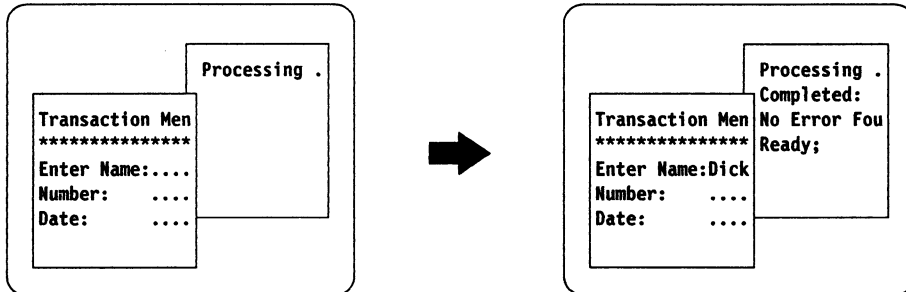
You can define the size and position of the windows and the definition is valid even when the display station is powered off.

The following capabilities are available for the window operation:

Capability	Page
Changing Window (Session)	2-16
Sizing and Moving Window	2-16
Managing Window Characteristics	2-18
Windowing Screen and Enlarging Window	2-20
Changing Screen Colors	2-22

One side of the keyboard overlay has the function key arrangement printed for the setup window mode operation.

The following keys are mainly used for the window personalizing operation. In setup window mode, the function keys are redefined.
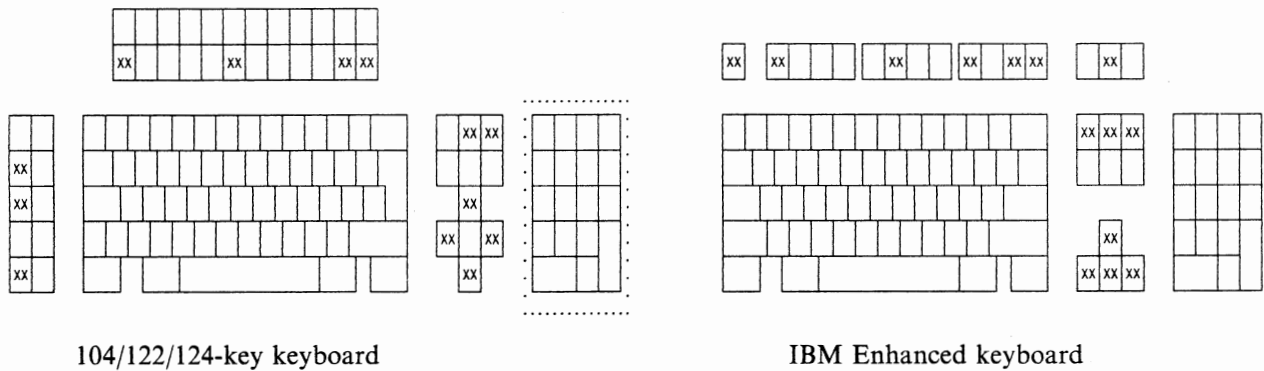
104/122/124-key keyboard   IBM Enhanced keyboard

```
 ── Keys Used ──────────────────────────────────────────────
  Setup            To enter or exit from setup mode
  ChgSc            To change the screen profile
  Jump             To jump to the next session
  CrSel            To set the border corner of windows
  (a-z)            Adding windows to screen profile
  F1               Listing windows
  F6               Deleting windows from screen profile
  F11              To move windows
  F12              To change the size of the windows
  Help             To display a Help window
  (cursor move)    To move the cursor (→, ←, ↓, and ↑)
  ◻↔◻              To enlarge the window or to window the screen
```

Changing Window (Session)

Pressing the Jump key changes your active window (session) to the next available window. As the active window changes, you should see an alphabet ("Short name" that you assigned to the session in setup mode) in the operator information area change. The jumping order can be revised using the screen profile (see "Managing Window Characteristics" on page 2-18).

```
|
|  _____
|      A0
```

Sizing and Moving Window

When the window size is equal to or larger than the screen size ("Screen rows x columns" in setup mode), you cannot see the window border.

You can change the window border by pressing the F12 key in setup window mode and using the CrSel and cursor move (→, ←, ↓, and ↑) keys.

You can move the window on the screen. The windows can then be arranged on the screen for your operational convenience. When the F11 key is pressed in setup window mode, you can move the window by using cursor move keys.

Pressing the Help key in setup window mode opens a help window on the screen and gives you a brief explanation for the setup window operation.

Example Operation

The following steps show an example operation for changing the window size.

1. Press the Setup key to enter setup mode. The "Online Setup" panel appears.

```
                              Online Setup

Move cursor to desired selection and press ENTER.
```

2. Select "Setup window" by using the cursor move keys and pressing the Enter key. You should exit from the "Online Setup" panel and see "SETUP" in the operator information area.

```
|
|  _____
|  SETUP   A0
```

3. Press the F12 key. You should see "SIZE" in the operator information area.

```
|
|  _____
|  SETUP   A0    SIZE
```

4. Move the bottom right corner of the window that you are defining by using the cursor move ($\rightarrow$, $\leftarrow$, $\downarrow$, and $\uparrow$) keys.
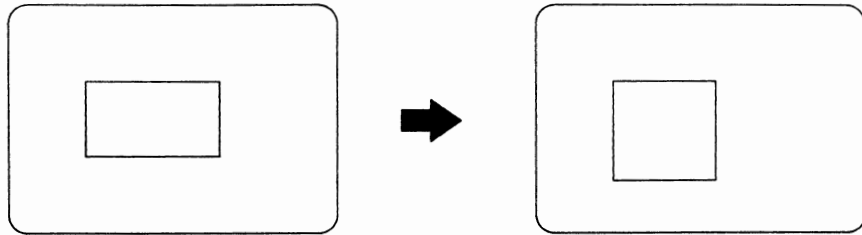
5. Press the CrSel key to set the corner.

   Note: Pressing the CrSel key moves the adjustable corner to the opposite corner of the rectangle.

6. Move the top left corner of the window that you are defining by using the cursor move keys.
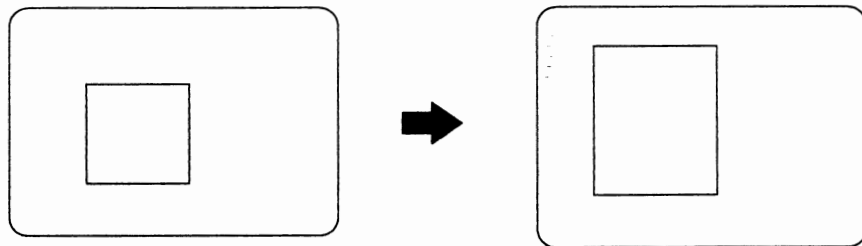
7. Press the F11 key. You should see "MOVE" in the operator information area.

| SETUP | Aθ | MOVE |
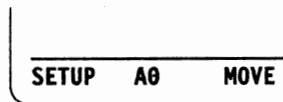
8. Move the window by using the cursor move ($\rightarrow$, $\leftarrow$, $\downarrow$, and $\uparrow$) keys.
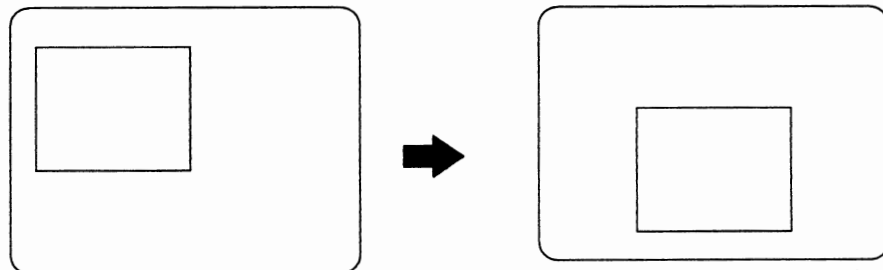
9. Press the Setup key to exit from setup mode.

Managing Window Characteristics

The display station can record three sets of window characteristics (screen profile). In a screen profile, window characteristics such as active session, window size, window position, and window jumping sequence are recorded. You can dynamically change these characteristics through the screen profile.

In the operator information area, you can see the active session short name (A-Z), that is defined in setup mode, and the screen profile number (0, 1, or 2). The following figure shows that this window's session short name is "A" and the screen profile number is "0".

When you press the F1 key in setup window mode, you should see a screen profile and session list on the screen.

```
|
|_____
|
| SETUP          A0
|_____
```

```
┌─────────LIST─────────┐
│ SCRN:WINDOWS  WINDOWS │
│                       │
│ █ :ABN       A - HOST1│
│              B - HOST2│
│ 1 :AB        N - NOTEPAD│
│                       │
│ 2 :AN                 │
│                       │
│                       │
└───────────────────────┘
```
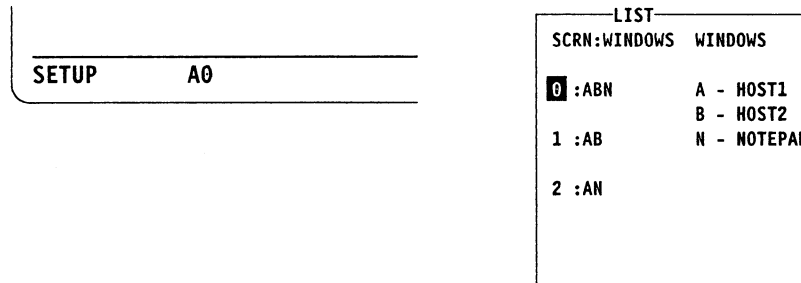
The session short name and screen profile number appear in the operator information area.

The screen profile (left) and session list (right) appear when the F1 key is pressed in setup mode.

When the above "LIST" is displayed, you can do the following:

- Press the Help key to display a help window.

- Press the ChgSc key or enter the screen profile number to change the active screen profile.

- Press the Jump key to change the active session.

- Press the F1 key to close "LIST" window.

- Press the F6 key to delete the active session from the active screen profile.

- Type the session short name (for example "B" to add session "B") to add a session to the active screen profile.

- Move or change the size of the window.

Example Operation

The following steps show the example operation for deleting session B from screen profile 1 and for adding session B to screen profile 2.

1. Press the Setup key to enter setup mode. The "Online Setup" panel appears.
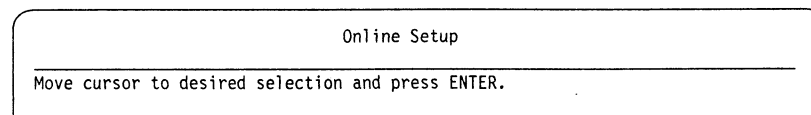
```
┌──────────────────────────────────────────────────────┐
│                      Online Setup                      │
│────────────────────────────────────────────────────── │
│ Move cursor to desired selection and press ENTER.      │
│                                                        │
└──────────────────────────────────────────────────────┘
```

2. Select "Setup window" by using the cursor move keys and pressing the Enter key. You should see "SETUP" in the operator information area.

```
|
| _____
|
| SETUP    A0
_____
```

Note: "A0" indicates that the active session is "A" and the screen profile is "0".

3. Press the F1 key to display the screen profile and session short name list.

```
_____
|  _____LIST_____                     /
| SCRN:WINDOWS   WINDOWS                /
|                                      |
| [0] :ABN       A - HOST1             |
|                B - HOST2             |
| 1 :AB          N - NOTEPAD           |
|                                      |
| 2 :AN                                |
|                                      |
|                                      |
|_____|
```

4. Press the ChgSc key to change the screen profile from "0" to "1".

```
|
| _____
|
| SETUP    A1
_____
```

5. Press the Jump key to change the current session from "A" to "B".

```
|
| _____
|
| SETUP    B1
_____
```

6. Press the F6 key to delete session B from screen profile 1.

```
_____
|  _____LIST_____                     /
| SCRN:WINDOWS   WINDOWS                /
|                                      |
| 0 :ABN         A - HOST1             |
|                B - HOST2             |
| [1] :A         N - NOTEPAD           |
|                                      |
| 2 :AN                                |
|                                      |
|                                      |
|_____|
```

7. Press the ChgSc key to change the screen profile from "1" to "2".

```
|
| _____
|
| SETUP    A2
_____
```

8. Type "B" to add session B to screen profile 2.

```
 ┌─────────────────────────────┐
 │   ┌LIST─────┐                │
 │   SCRN:WINDOWS  WINDOWS      │
 │                              │
 │   0 :ABN        A - HOST1    │
 │                 B - HOST2    │
 │   1 :A          N - NOTEPAD  │
 │                              │
 │   ▌2▐ :ABN                   │
 │                              │
 │                              │
 │                              │
 └──────────────────────────────│
 │                              │
 │   ─────────────────────      │
 │   SETUP    B2                │
 └──────────────────────────────
```
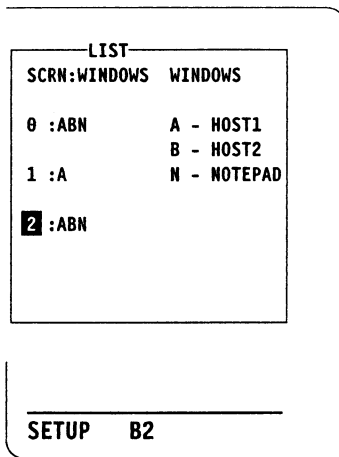
9. Press the Setup key to exit from setup mode.

Windowing Screen and Enlarging Window

You can place the display station in either windowed or enlarged mode by pressing the ◻↔☐ key. If the window is defined as a full screen, there may be no difference observed when the ◻↔☐ key is pressed.

In enlarged mode, you should see the symbol ◻↔☐ in the operator information area and the whole screen contents are displayed on the screen. This is useful when you need to see the whole screen contents. In windowed mode, you do not see the symbol ◻↔☐ in the operator information area.
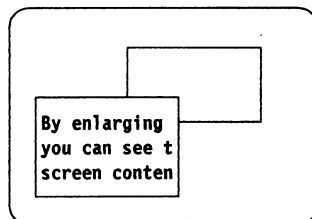
Windowed   Enlarged

```
┌──────────────────────┐        ┌──────────────────────┐
│       ┌────────────┐ │        │ By enlarging the screen, │
│       │            │ │        │ you can see the whole │
│   ┌───┴──────┐     │ │   ➡    │ screen contents. When │
│   │ By enlarging    │ │        │ you press the Enlarge key │
│   │ you can see t│──┘ │        │ again, the screen returns │
│   │ screen conten│    │        │ to the window mode.   │
│   └──────────────┘    │        │                       │
└──────────────────────┘        └──────────────────────┘
```

Changing Colors and Highlighting

You can change colors and highlighting of the following items in setup mode:

- Notepad colors
- Notepad highlighting
- Window background color[1]
- Window border[1]
- Base color[1]
- Rule line color
- Graphic cursor color
- Print trim border color
- Print color

One side of the keyboard overlay has the function key arrangement printed for the color keys.

The following keys are used for the changing colors operation.
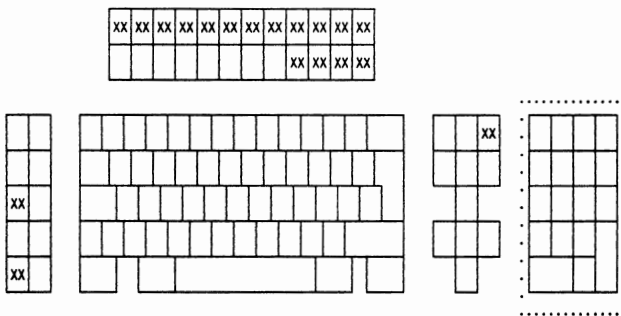
104/122/124-key keyboard
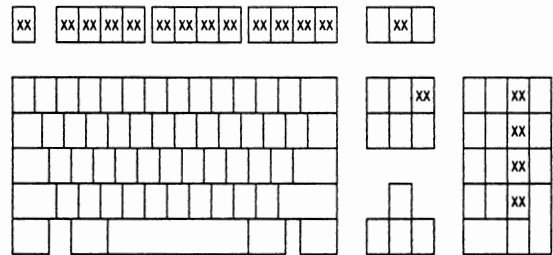
IBM Enhanced keyboard

---

[1] Pressing the Help key opens a help window on the screen and displays a brief information for the operation.

```
┌─ Keys Used ──────────────────────────────────────────────────────┐
│                                                                   │
│  Setup            To enter or exit from setup mode                │
│  Jump             To change the session                           │
│  (color)          Color keys                                      │
│                   Red            F13                               │
│                   Pink           F14                               │
│                   Green          F15                               │
│                   Yellow         F16                               │
│                   Blue           F17                               │
│                   Turquoise      F18                               │
│                   White          F19                               │
│                   default        F20 (▶: Field inherit)           │
│  (highlighting)   Highlighting keys                               │
│                   ▣      reverse                                  │
│                   ☀      blink                                   │
│                   ạ      underscore                               │
│                   ▶      default                                  │
│                          104/122/124-key keyboard: F12            │
│                          IBM Enhanced keyboard: (on the numeric keypad) │
│  F13              To change the field for color change            │
│  F21              Four base color                                 │
│  F23              Window background color                         │
│  F24              Window border color                             │
│  Help             To display a Help window                        │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

Note: To use a color key on the IBM Enhanced keyboard, you should press and hold down the Alt and Shift key, and then press the color key (for example the F16 key for Yellow).

Changing Screen Colors

You can change colors of the following two items on the screen: **A** Window Background, and **B** Window Border.
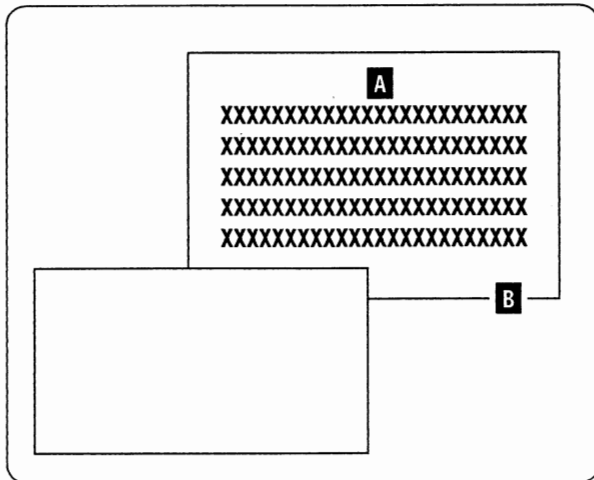
To change the colors of the above items, press the appropriate key to select the item in setup window mode:

F23   Window Background Color
F24   Window Border Color

The operator information area shows the selected item ("BORDR" for window border and "BKGND" for window background) for changing colors. To change the color of the desired item, press the appropriate color key, for example, the Yellow key (F16 while holding down the Alt key for the 104/122/124-key keyboard or the Alt and Shift keys for the IBM Enhanced keyboard). Pressing the F3 key places the display station back in setup mode.

Example Operation

The following steps show the example operation for changing the color of the window border.

1. Press the Setup key to enter setup mode. The "Online Setup" panel appears.

```
┌─────────────────────────────────────────────────────────────────┐
│                          Online Setup                           │
│─────────────────────────────────────────────────────────────────│
│ Move cursor to desired selection and press ENTER.               │
│                                                                 │
│                                                                 │
└─────────────────────────────────────────────────────────────────┘
```

2. In the panel, select "Setup window" using the cursor move keys and pressing the Enter key. You should exit from the setup window panel and see "SETUP" in the operator information area.

```
|
├──────────
│ SETUP    AΘ
└──────────
```

3. Press the F24 key. You should see "BORDR" in the operator information area.

```
|
├──────────────────────
│ SETUP    AΘ    BORDR
└──────────────────────
```

4. Press the color key that you desire, for example the Yellow key (F16 while holding down the Alt key for the 104/122/124-key keyboard or the Alt and Shift keys for the IBM Enhanced keyboard). The border color should change to yellow.

   Note: You can change the color back to the default by pressing the F20 key.

5. Press the Setup key to exit from the setup mode.

Changing Colors and Highlighting in Notepad

You can specify color or highlighting for each character or characters used in the notepad.

Colors in Notepad

Pressing a color key, for example the Yellow key (F17 while holding down the Alt key for the 104/122/124-key keyboard or the Alt and Shift keys for the IBM Enhanced keyboard), causes a selected-color symbol "■" (in yellow) to appear in the operator information area. While "■" stays in the operator information area, the subsequent key input will appear in the notepad in the color specified. To clear "■", press the ▶ (color field inherit) key (F20 while holding down the Alt key for the 104/122/124-key keyboard or the Alt and Shift keys for the IBM Enhanced keyboard).

Highlighting in Notepad

Pressing a highlighting key, for example the reverse key (❽ while holding down Alt key), causes a selected-highlighting symbol "❽" to appear in the operator information area. While "❽" stays in the operator information area, the subsequent key input will appear in the notepad in the highlighting specified. To clear "❽", press the ▶ (highlighting field inherit) key (F12 while holding down the Alt key for the 104/122/124-key keyboard or ❽ key in the numeric pad while holding down the Alt key for the IBM Enhanced keyboard).

Base Color

When the host application program does not specify colors used for displaying data, the display station automatically uses the pre-defined colors for the basic fields. The display screen has the following basic fields and you can define one of seven colors for each field.

CF1	Input, normal intensity
CF2	Input, highlighted
CF3	Protected[2], normal intensity
CF4	Protected[2], highlighted

To change the colors of the base color, press the Base Color (F21) key in setup window mode. The following four symbols should appear in the operator information area.

```
CF1=▋  CF2=▋  CF3=▋  CF4=▋
```

Note: "▋" indicates the current color assignment for the field.

Pressing the F13 key changes the selected field for color change (for example, from "CF1" to "CF2"). As the selected field is changed, you should see the appropriate display field is underlined on the screen.

---

[2] Display field where key input is not allowed.

Pressing the desired color, for example the Yellow key (F17 while holding down the Alt key for the 104/122/124-key keyboard or the Alt and Shift keys for the IBM Enhanced keyboard) changes the color of the selected field.

Example Operation

The following steps show the example operation for changing the base color of the highlighted unprotected field.

1. Press the Setup key to enter setup mode. The "Online Setup" panel appears.
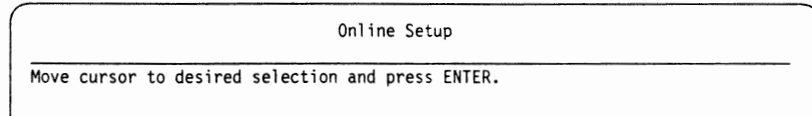
```
/                                                                    \
                         Online Setup
          _____
          Move cursor to desired selection and press ENTER.
|                                                                    |
```

2. In the panel, select "Setup window" using the cursor move keys and pressing the Enter key. You should exit from the setup window panel and see "SETUP" in the operator information area.

```
|
  _____
  SETUP    A0
```
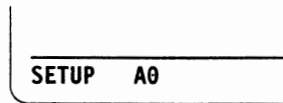
3. Press the F21 key. You should see the current color assignment indicators for the base color fields in the operator information area and the current target field is underlined.

```
                                  |
  _____
  CF1=█ CF2=█ CF3=█ CF4=█            /
```
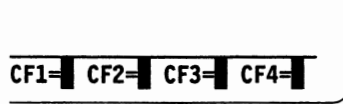
4. Press the F13 key to change the field from "CF1" to "CF2".

5. Press a color key to change the color of the field, for example the Yellow key (F17 while holding down the Alt key for the 104/122/124-key keyboard or the Alt and Shift keys for the IBM Enhanced keyboard). The color indicator of CF2 "█" should change to yellow.

6. Press the Setup key to exit from the setup mode.

Other Colors

You can change colors in the following setup panels.

Rule: The rule line color selected can be either white or green in "Display Setup" panel. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1 for the operation.

Graphic Cursor: The graphics cursor color selected can be either white or green in "Display Setup" panel. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1 for the operation.

Print Trim Border: The print trim border color selected can be either white or green in "Printer Setup" panel. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1 for the operation.

Colors on Printer: When you make a screen copy on the local printer, some colors of graphics data on the screen can be disregarded for printing. Selecting "Off" for the colors on "Printer Setup" panel turns off the colors for printing. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1 for the operation.

Copying Screen Contents

You can copy a part of screen contents to the other part on the screen. This is useful to copy a block of text from one window (session) to another.
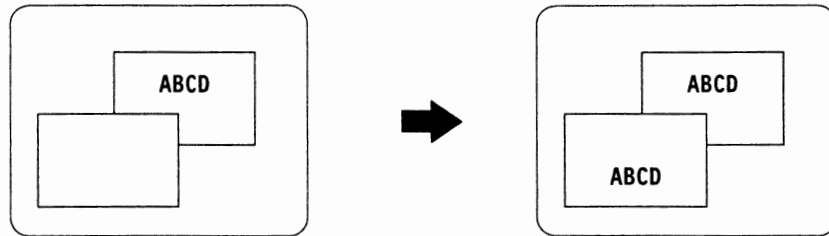
One side of the keyboard overlay has the function key arrangement printed for the copy operation.

The following keys are mainly used for the copying screen contents operation.
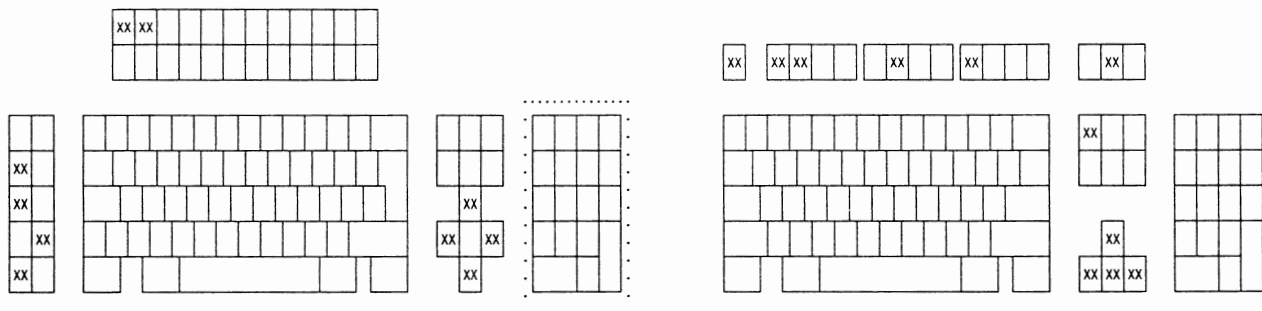
104/122/124-key keyboard   IBM Enhanced keyboard

Keys Used

CrSel	To set the copy area corner
Copy	To enter copy mode
Help	To invoke the Help window in copy mode
(cursor move)	To move the cursor (→, ←, ↓, and ↑)
F13	To change to the source copy mode, or to cancel the copy source area definition
F14	To change to the target copy mode, or to cancel the copy target area definition
□↔□	To enlarge the window

Pressing the Copy key (while holding down the ⇧ key for the 104/122/124-key keyboard or the Alt key for the IBM Enhanced keyboard) places the display station in copy mode and "COPY" is displayed in the operator information area. In copy mode, the Help function is available when the Help key is pressed. The Help window displays a brief description of the Copy function.

When "COPY" is displayed in the operator information area, pressing the F13 key places the display station in copy source mode which allows you to define the copy source area. You should see "SOURC" in the operator information area.

```
|
|  _____
| | COPY    A0    SOURC
\_|
```

Pressing the F14 key places the display station in copy target mode which allows you to define the copy target area. You should see "TARGT" in the operator information area.

```
|
|  _____
| | COPY    A0    TARGT
\_|
```

When you enter copy mode, the display station is placed in the copy source mode.

If you need to see the entire screen, press the ▣↔☐ key. You do not have to window sessions for copy operation. You can define the copy source area, change the session using the Jump key, and define the copy target area.

Note: You cannot copy the contents to the area which contains non-input fields.

Example Operation

The following steps show the example operation for copying a block of texts from one window to another.

1. Press the Copy key (while holding down the ⇑ key for the 104/122/124-key keyboard or the Alt key for the IBM Enhanced keyboard) to place the display station in copy mode. You should see "COPY" in the operator information area.

```
|
|  _____
| | COPY    A0   .SOURC
\_|
```

2. Place the cursor in the top left corner of the desired area to copy.
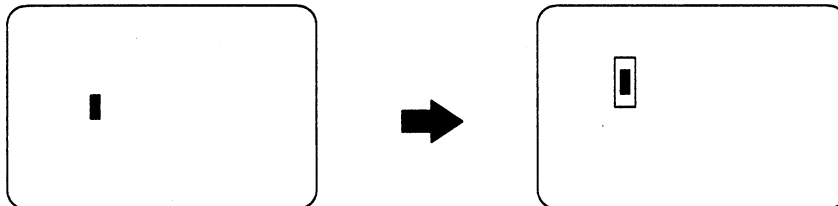
3. Press the CrSel key to set the corner.
4. Move the cursor to the opposite corner of the the desired area to copy.
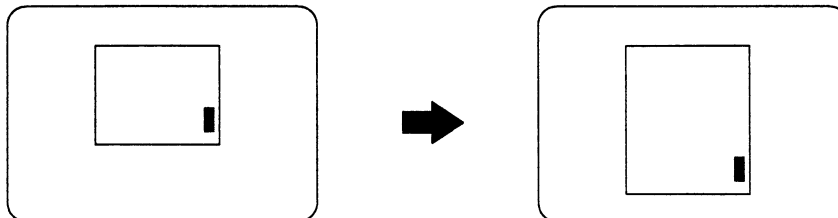
5. Press the CrSel key to set the corner. The copy area is underlined. "TARGT" is displayed in the operator information area and the display station is placed in

the copy target mode. (You can cancel the copy source area by pressing the F13 key)
6. Press the Jump key and you move to the target window.
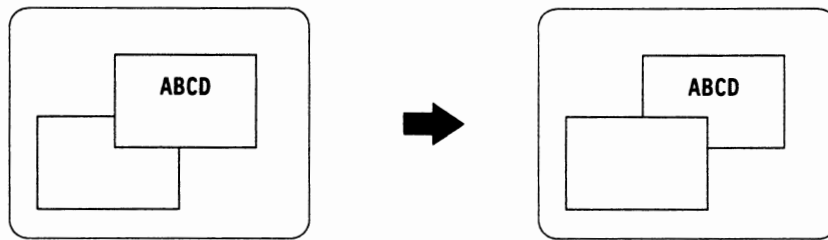
7. Place the cursor in the top left corner of the target area.
8. Press the CrSel key to set the area to copy. The defined area is highlighted in reverse video. (You can cancel the copy target area by pressing the F14 key).
9. Press the Enter key to accept copy.
10. Press the Copy key (while holding down the ⇧ key for the 104/122/124-key keyboard or the Alt key for the IBM Enhanced keyboard) to exit from copy mode.

While in copy mode, you can do the copy operation many times.

Using Mouse, Plotter, and Tablet

When using a mouse, plotter, or tablet, you should follow the operation instructions given in the appropriate manuals prior to performing display station operations.

Mouse

The cursor moves according to the mouse movement.

The 3179-G/3192-G mouse and the 3472-G mouse have the following physical and functional differences.

The 3472-G can change the graphic cursor characteristics such as style, color, and blinking state in online setup mode. The graphic cursor characteristics can also be changed by using the keyboard keys for the 3179-G/3192-G and 3472-G.

The following figure shows the mouse button arrangement for the 3179-G/3192-G and 3472-G.
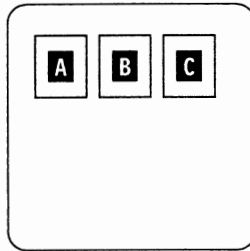
3179-G/3192-G   **3472-G**
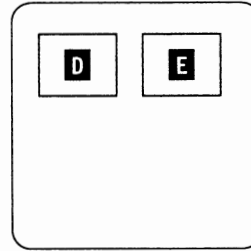
Each button has a function mode assignment.

Table 2-2. 3179-G/3192-G Mouse Button Functions

	Alphanumeric mode	Graphic mode
A	Cursor Select	Programmable
B	Selectable Field Tab	Programmable
C	Reset	Reset

Table 2-3. 3472-G Mouse Button Functions

	Alphanumeric mode	Graphic mode
D	Enter	Programmable
E	Reset	Programmable

Notes:

1. The mouse does not work when the tablet is attached.

2. The mouse cannot be used for defining areas in the print trim, copy, and setup window operations. You have to use the cursor move keys to define these areas.

Plotter

If a plotter other than an IBM is attached to the display station, you need to enter the plotter model on "Customization" panel. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1 for operational information.

The following data is needed to attach the plotter to the display station.

Handshake	Hardwire
Mode[3]	Direct
HP-IB[3]	Standard
Duplex[3]	Half
Parity	Off
Baud rate	4800
Word length	8 bits
Number of stop bits	1 bit
Data flow[3]	Remote standalone
Auto feed[3]	Yes(*)

Refer to the plotter user's guide for setup operational information.

Tablet

The tablet does not require any specific setting for attaching to the display station. Refer to the manuals available for the tablet for operational information.

---

[3] Available for the IBM 6182 only.

Printing Screen Contents

You can make a copy of your screen on a printer that is attached to either the control unit or the display station. The printer attached to the control unit is called a subsystem printer. The printer attached to your display station is called a local printer. To select either the subsystem or local printer, refer to "Customization" on page A-4.

Subsystem Printer   **Local Printer**
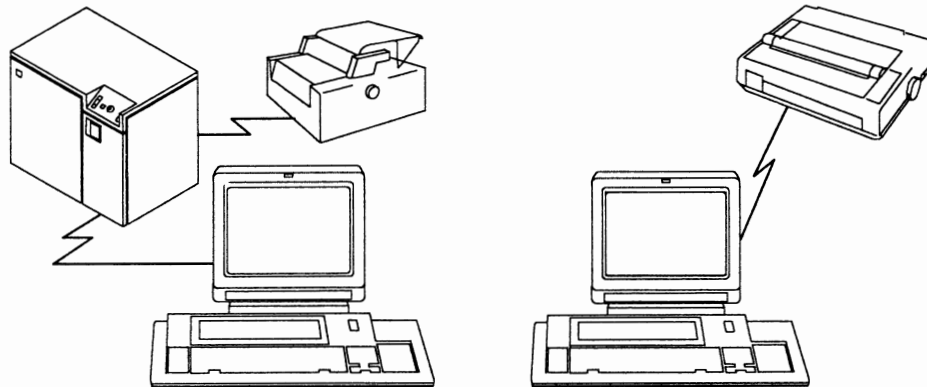
The local printer can be defined as a host addressable printer with the appropriate control unit customization and system generations. The host application program can submit a print request to the local printer as well as to the subsystem printer.

Note: During the host addressable printing on the local printer, you should not attempt to make a screen copy; this would cause the screen contents to be inserted and printed in the host addressable print contents.

To make a screen copy, follow the instructions shown on the following pages. Procedures will vary depending on the printer that is attached.

The following keys are mainly used for the printing screen contents operation.
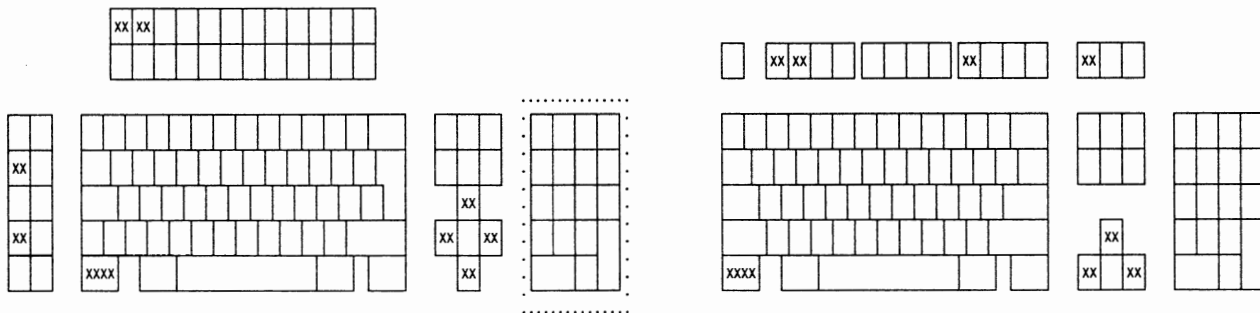
104/122/124-key keyboard   IBM Enhanced keyboard

```
┌── Keys Used ──────────────────────────────────────────────────────────────┐
│                                                                            │
│  Print      To initiate printing or place the display station in local print mode │
│  Ident      To define the destination printer                             │
│  CrSel      To define the corner of the print area                        │
│  F13        To change the print mode                                      │
│  F14        To invoke the printer control panel                           │
│  Quit       To cancel printing                                            │
│  (cursor move) To move the cursor (→, ←, ↓, and ↑)                        │
│                                                                            │
└────────────────────────────────────────────────────────────────────────────┘
```

Subsystem Print

The screen contents can be printed on a subsystem printer which is attached to the same control unit as the display station. Printing the screen contents to the subsystem printer requires the appropriate control unit customization. You need to check with your system coordinator if the subsystem print operation fails.

The following instructions explain how to print the screen contents on the subsystem printer.

```
┌── Instructions ───────────────────────────────────────────────────────────┐
│                                                                            │
│  1. Do you see ▭—▭99 or ▭→▯99 in the operator information area?            │
│     Yes,  the local printer is assigned to your display station. Go to     │
│           Appendix A, "Setup Mode and Printer Control Operations" on        │
│           page A-1, change the printer ID to "Subsystem" in Customization, and │
│           retry the operation.                                             │
│     No,   if you see a message other than a number at the right of ▭—▭, refer to │
│           Chapter 3, "Operator Messages" on page 3-1. Otherwise, go to the  │
│           next step.                                                       │
│  2. Press the Print key to start printing.                                 │
│                                                                            │
│  Note:  If you want to change the printer destination, press the Ident key and set │
│  the appropriate printer ID for printing.                                  │
│                                                                            │
└────────────────────────────────────────────────────────────────────────────┘
```

Local Print (whole screen)

You can print the screen contents to the local printer which is attached to your display station. If the print operation fails, you should check the setup values on the setup panels, and then the printer operation manuals.

The following instructions explain how to print the screen contents on the local printer.

Instructions

1. Do you see ▭—▭99 or ▭→▯99 in the operator

   Yes, go to the next step.

   No, the local printer is not assigned to your display station. Go to Appendix A, Setup Mode and Printer Control Operations, set your local printer ID in "Customization" on page A-4, and retry the operation.

2. Press the Print key.

3. Do you see "PRINT SCRN" in the operator information area?

   Yes, go to the next step.

   No, press the F13 key. Go to the next step.

4. Press the Enter key to start printing.

Local Print (partial screen)

You can print a part of the screen contents to the local printer which is attached to your display station. If the print operation fails, you should check the setup values on the setup panels, and then the printer operation manuals.

The following instructions explain how to print a part of the screen contents on the local printer.

```
┌── Instructions ───────────────────────────────────────────────────

  1. Do you see ▭—▭99 or ▭→▯99 in the operator
     Yes,  go to the next step.
     No,   a local printer is not assigned to your display station.  Go to
           Appendix A, Setup Mode and Printer Control Operations, set your
           local printer ID in "Customization" on page A-4, and retry the opera-
           tion.
  2. Press the Print key.
  3. Do you see "PRINT TRIM" in the operator information area?
     Yes,  go to the next step.
     No,   press the F13 key.  Go to the next step.
  4. Using the cursor move keys, move the top left corner of the rectangle to the
     desired position.
```
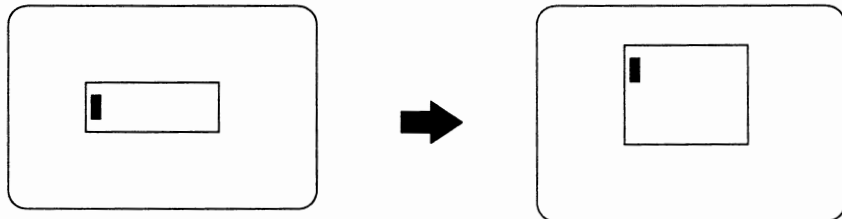


```
  5. Press the CrSel key to set the top left corner.
  6. Using the cursor move keys, move the bottom right corner of the rectangle
     to the desired position.
```
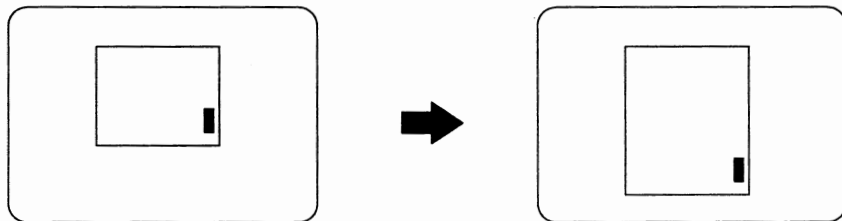


```
     Note:  Pressing the CrSel key moves the cursor to the opposite corner of the
     rectangle.
  7. Press the Enter key to start printing.
```

Pressing the Quit key while pressing and holding down the Alt key cancels the printing. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1 for more information about printer controls.

Recording and Playing Keystrokes

With the Record-ID keys (see the "XX" marked keys in the figure below), you can store a sequence of keystrokes and define a recording name. Approximately 4000 keystrokes, including the shift keys and the cursor move keys, can be recorded. The display station stores the recorded keystrokes even when the display station is powered off. The display station tells you how many keystrokes can be recorded in record mode. After a sequence of the keystrokes has been recorded, you can replay the keystrokes with the Play function.

Notes:

1. If the Record/Play function needs to be restricted or disabled, refer to page A-19.
2. The following keys are not recorded but functional:
   - Rule
   - Zoom (□↔□)
   - Help
3. The following keys are not recorded and not functional:
   - Play
   - Setup
   - Copy
   - Print
   - Ident
   - Jump
   - ChgSc
4. Replaying the recorded host function key may cause the loss of subsequent keystrokes because of the host communication.

The following figure shows the Record-ID keys that keystrokes can be assigned to.

104/122/124-key keyboard   IBM Enhanced keyboard
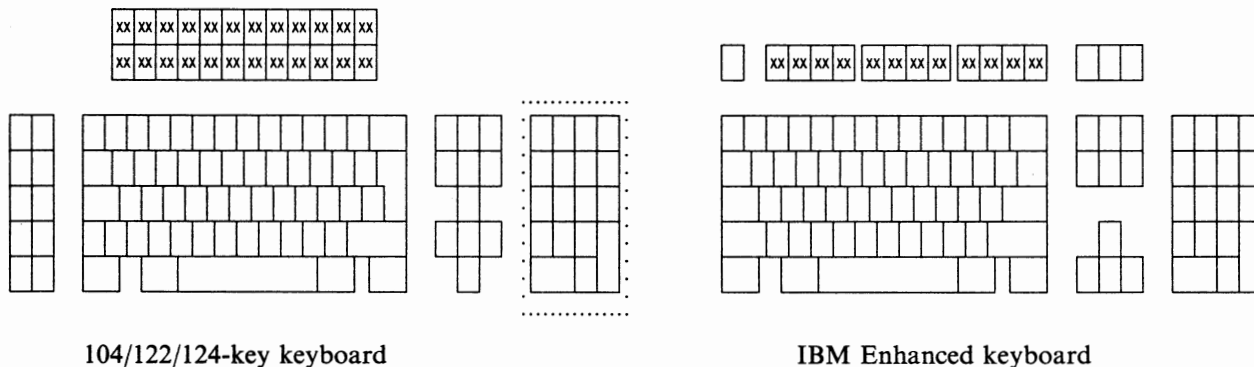
The "Example Operation" on page 2-40 will explain this operation.

Record Operation

The following keys are mainly used for the play operation.
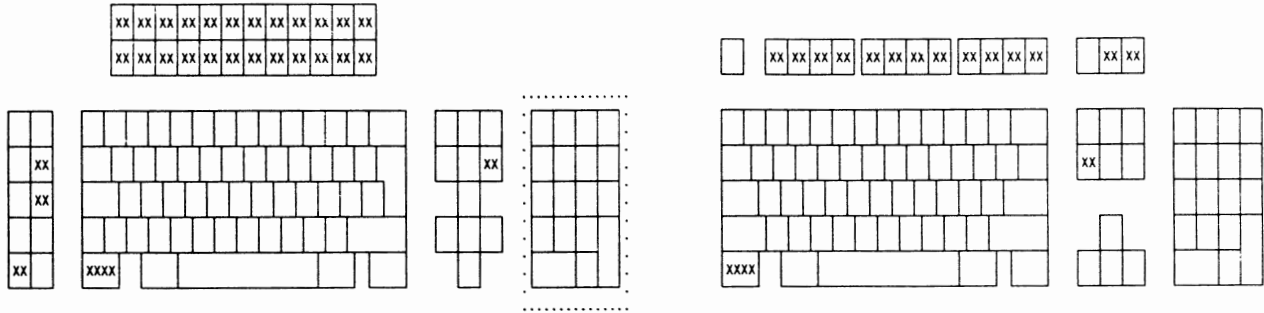
104/122/124-key keyboard   IBM Enhanced keyboard

```
┌─── Keys Used ────────────────────────────────────────────────────────┐
│                                                                        │
│  Record     To enter or to exit from record mode                       │
│  Quit       To quit the record operation                               │
│  Pause      To stop the recording of the keystrokes temporarily        │
│  Delete     To delete the recorded keystrokes                          │
│  Fn         To specify the Record-ID key that the keystrokes are assigned to (n: │
│             1-24).                                                      │
│  Enter      To display the list panel                                  │
│  Help       To display a help window                                   │
│                                                                        │
└────────────────────────────────────────────────────────────────────┘
```

To record a sequence of keystrokes:

1. Press the Record key.

   The following items appear in the operator information area: an "R", a recording name (title) entry area, a number, and the indicator of Record-ID keys. You can use this key even when the Do-Not-Enter message appears in the operator information area. The number indicates approximately how many keystrokes can be recorded. The symbol ⊟ indicates the Fn positions where keystrokes have already been assigned to.

```
┌──────────────────────────────────────────────────────────────────────
│
│  RECRD       TITLE                              R4000       ⊞ ⊞ ⊞
└──────────────────────────────────────────────────────────────────────
```
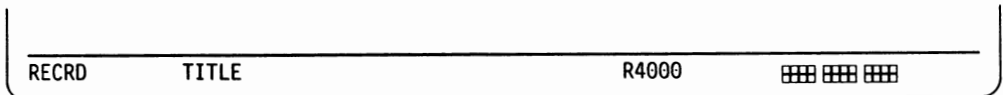
Figure   2-4. Record Operation

If you press the Enter key, a list of the recording names and their recording sizes will be displayed.

```
┌────LIST─────────────────┐
│RECORDINGS KEY:TITLE      │
│                          │
│F1 :ABC      F13:TEST      │
│F2 :VM1      F14:*         │
│F3 :VM2      F15:          │
│F4 :VM3      F16:          │
│F5 :VM4      F17:          │
│F6 :VM5      F18:TSO       │
```
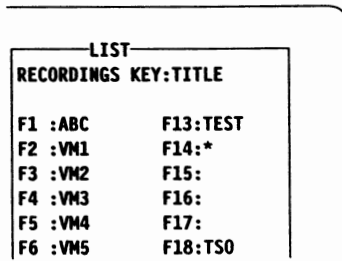
2. Enter a recording name (title) that you want to assign the keystrokes. Press the upper group (Record-ID) key, or press the Record key to exit to normal mode and quit the record operation.

   If any keystrokes have already been assigned to the key, and the Record-ID key is pressed, the key number is displayed in reversed-red. Assigning the recording name is optional.
3. Enter the keystrokes that you want to record. You can also press the Delete key which will clear all of the recorded keystrokes of the selected Record-ID key and return to the previous step.
4. Press the Record key to complete the record operation.

When you complete entering the keystrokes, press the Record key. This will store and assign the keystrokes to the Record-ID key that you selected. If you press the Quit key while you are entering the keystrokes, the recorded keystrokes of the Record-ID key will be cleared and the display station will exit to normal mode.

If you press the Pause key, the symbol "R ⅄⌃" appears. Keystrokes will not be recorded while "R ⅄⌃" is present. Press the Record key again to continue recording. Pressing the Quit key clears the recorded keystrokes of the Record-ID key, and the display station exits to normal mode.

Keystrokes replaying in Play mode will stop temporarily at the point you pressed the Pause key in Record mode. You can continue normal operation. By pressing the Play key, the display station continues to replay the recorded keystrokes.

While you are recording the keystrokes, the number that appears at the right of the symbol "R" will be decreased. This number tells you approximately how many remaining keystrokes you can enter.

When you press the Help key during the record operation, a Help window is displayed. You can obtain record operation reference information from this window. You can continue the record operation when the Help window is displayed.

Play Operation

The following keys are mainly used for the play operation.
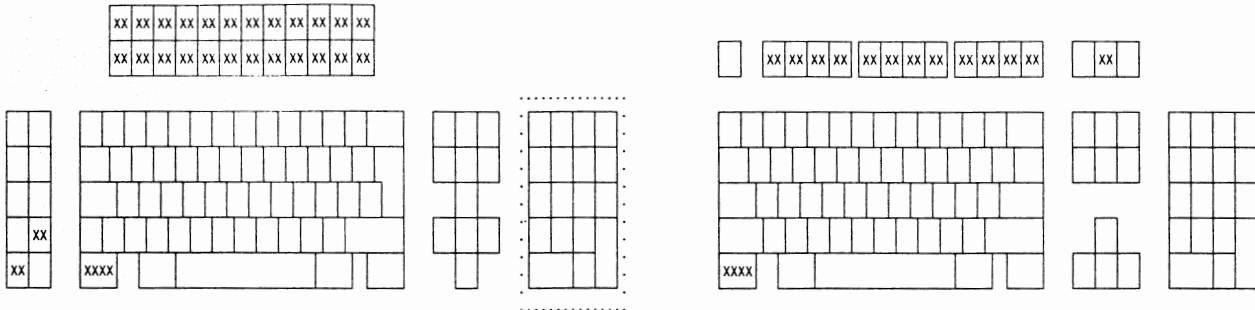
104/122/124-key keyboard   IBM Enhanced keyboard

```
┌─── Keys Used ────────────────────────────────────────────────────┐
│                                                                    │
│  Play      To enter play mode                                      │
│  Quit      To quit the play operation                              │
│  Fn        To specify the record-ID key that you replay the keystrokes of (n: │
│            1-24)                                                    │
│  Enter     To display the list panel                               │
│  Help      To display a help window                                │
│                                                                    │
└────────────────────────────────────────────────────────────────────┘
```

To play the recorded keystrokes:

1. Press the Play key. A "P" and the recorded keys indicator appear in the operator information area. You can use this key even if the Do-Not-Enter message appears in the operator information area.
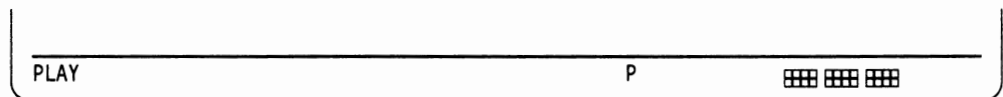
Figure 2-5. Play Operation

2. Press one of the following keys:
   - The key that the recorded keystrokes were assigned to. You can then start playing the recorded keystrokes.
   - The Play key to exit to normal mode.
   - The Enter key to display a record list. You can then check the current keystroke recording status.

When you press the Record-ID key that you assigned the keystrokes to, the recorded keystrokes are replayed. If you press the Quit key while replaying, the display station exits to normal mode.

If "P ⚡∧" appears in the operator information area, you can continue normal operations temporarily except some local operations, such as the print and setup operations. You can type the appropriate commands or data, and press the Play key to continue replaying the rest of the recorded keystrokes.

When you press the Help key during the play operation, a Help window is displayed. You can obtain play operation reference information from this window.

Example Operation

The following steps show an example of recording and playing keystrokes.

- You want to send a note about a party to Bob and Jeff.
- You want Bob to confirm if he is going to attend.
- You want Jeff to inform Margaret if he is going to attend.

Open a file using a text editor and:

```
SAMPLE1  SCRIPT  A1    F 80   TRUNC=80   SIZE=19   LINE=5   COL=1   ALT=1
====>
   |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...

   0 * * * TOP OF FILE * * *
   1 Bob,
   2
   3
   4
   5
   6
   7
   8
   9
  10
  11
  12
  13
  14
  15
```

- Type "Bob,".

- Press the Record key to enter record mode. The symbol "R" appears in the operator information area.

- Press the upper group (Record-ID) key. The symbol "Fn" (n: 1 to 24) appears in the operator information area.

```
SAMPLE1  SCRIPT  A1    F 80   TRUNC=80   SIZE=19   LINE=5   COL=1   ALT=1
====>
   |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...

   0 * * * TOP OF FILE * * *
   1 Bob,
   2  The following is the schedule for Dick's birthday
   3 party.  Please let
   4
   5
   6
   7
   8
   9
  10
  11
  12
  13
  14
  15
```

- Type the text as shown in the left figure.

- Press the Pause key to temporarily suspend recording of the keystrokes. The symbol "R ⚥∧" appears in the operator information area.

```
SAMPLE1  SCRIPT  A1    F 80   TRUNC=80   SIZE=19   LINE=5   COL=1   ALT=1
====>
   |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...

   0 * * * TOP OF FILE * * *
   1 Bob,
   2  The following is the schedule for Dick's birthday
   3 party.  Please let me
   4
   5
   6
   7
   8
   9
  10
  11
  12
  13
  14
  15
```

- Type "me". This is not recorded.

- Press the Record key to return to record mode. The symbol "R ⚥∧" disappears.

```
SAMPLE1  SCRIPT   A1    F 80   TRUNC=80   SIZE=19   LINE=5   COL=1   ALT=1
====>
     |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...

  0 * * * TOP OF FILE * * *
  1 Bob,
  2  The following is the schedule for Dick's birthday
  3 party.  Please let me know if you plan to attend by
  4 next Monday.
  5
  6    Place:   Dick's place
  7    Time:    6 pm to 8 pm
  8    Fee:     $ 15.00
  9
 10
 11
 12 Regards,
 13 George
 14
 15
```

- Type the remainder of the text as shown in the left figure.

- Press the Record key to complete the operation and exit to normal mode. The symbol "R" disappears.

```
SAMPLE2  SCRIPT   A1    F 80   TRUNC=80   SIZE=19   LINE=5   COL=1   ALT=1
====>
     |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...

  0 * * * TOP OF FILE * * *
  1 Jeff,
  2
  3
  4
  5
  6
  7
  8
  9
 10
 11
 12
 13
 14
 15
```

- Save the previous file and open a new file for Jeff.

- Type "Jeff,".

- Press the Play key to enter play mode. The symbol "P" appears in the operator information area.

```
SAMPLE2  SCRIPT   A1    F 80   TRUNC=80   SIZE=19   LINE=5   COL=1   ALT=1
====>
     |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...

  0 * * * TOP OF FILE * * *
  1 Jeff,
  2  The following is the schedule for Dick's birthday
  3 party.  Please let
  4
  5
  6
  7
  8
  9
 10
 11
 12
 13
 14
 15
```

- Press the Record-ID key that you assigned the previous keystrokes to. The recorded text will be displayed up to "let".

```
SAMPLE2  SCRIPT   A1    F 80   TRUNC=80   SIZE=19   LINE=5   COL=1   ALT=1
====>
     |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...

  0 * * * TOP OF FILE * * *
  1 Jeff,
  2  The following is the schedule for Dick's birthday
  3 party.  Please let Margaret
  4
  5
  6
  7
  8
  9
 10
 11
 12
 13
 14
 15
```

- The symbol "P ⚐" appears in the operator information area.

- Type "Margaret".

```
SAMPLE2  SCRIPT  A1    F 80   TRUNC=80   SIZE=19   LINE=5   COL=1   ALT=1
====>
    |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...

  0 * * * TOP OF FILE * * *
  1 Jeff,
  2 The following is the schedule for Dick's birthday
  3 party.  Please let Margaret know if you plan to attend by
  4 next Monday.
  5
  6    Place:   Dick's place
  7    Time:    6 pm to 8 pm
  8    Fee:     $ 15.00
  9
 10
 11
 12 Regards,
 13 George
 14
 15
```

- Press the Play key to continue displaying the recorded keystrokes. The remainder of the recorded text will be displayed. The symbol "P" disappears.

Save the file and the operation is completed.

Making Entry and Edit More Effective

The Entry Assist function allows you to enter characters in a typewriter like environment without host application support. You can set tab stops, an end-of-line signal position, and left and right margins. When you type a word over the right margin and the word wrap is turned on, the word moves to the first position of the next line. The backspace key moves the cursor backward and erases the existing characters.

Using Entry Assist Keys

One side of the keyboard overlay has the function key arrangement printed for the entry assist operation.

The following keys are redefined to use Entry Assist depending on your keyboard layout ID.

104/122/124-key Keyboard	IBM Enhanced Keyboard
Document mode On/Off F13 after pressing ExSel	Document mode On/Off F1 after pressing ExSel
Word Wrap On/Off F14 after pressing ExSel	Word Wrap On/Off F2 after pressing ExSel
Change Format F15 after pressing ExSel	Change Format F3 after pressing ExSel
Error-correcting Backspace (←) ←	Error-correcting Backspace (←) ←

Setting Options

By performing the following steps you can set the tab stops, an end-of-line signal position, and the screen margins.

1. Press the ExSel key. The symbol ▶ is displayed in the operator information area.
2. Press the document mode On/Off key.

   The symbol DOC ⇓ is displayed in the operator information area. The display station is in document mode and the word wrap function is turned on.
3. Press the ExSel key. The symbol ▶ is displayed in the operator information area.

4. Press the change-format key. The scale line is displayed at the cursor position.

```
<----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+--->
```

At the desired column, you can set positions for tab stops, an end-of-line signal, screen margins, and home position by using the following keys:

→| Tab stops (marked by _)
<   Left margin
>   Right margin
CrSel   Unlocking margin/changing scale line origin
*   End-of-line signal
Home   Home position

If you set the end-of-line signal (*), the alarm sounds when you enter a character beyond the column that you set the signal.

```
0----+--<-1--_-+----2----+--_-3----+----4--_-+----5----+-*--6----+>---7----+----
```

Pressing the Clear key cancels all tab settings. You can use the Delete character key to clear each tab stop, end-of-line signal position, and home position.
5. Press the ExSel key.
6. Press the change-format key. The scale line disappears and the setting is completed.

This setting will be stored even if you turn off the display station.

Using Word Wrap Function

The word wrap function default is "on". When you press the ExSel key, and press the word wrap key (while the display station is in document mode), the word wrap symbol (⚓) disappears from the operator information area and word-wrap is turned off. Pressing the word wrap key again, turns on word wrap.

When you type a word over the right margin, the word moves to the first position of the next line. The following shows an example of the word wrap operation. Assuming that the left and right margins are set as indicated with " < " and " > " below.

```
0----+--<-1--_-+----2----+--_-3----+----4--_-+----5----+-*--6----+-->--7----+----
```

You can start entering characters and the word entered over the right margin moves to the next line.

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                                                                               │
│       Entering a word over the right margin causes the word to _              │
│                                                                               │
```

↓

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                                                                               │
│       Entering a word over the right margin causes the word to wr_            │
│                                                                               │
```

↓

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                                                                               │
│       Entering a word over the right margin causes the word to                │
│       wrap _                                                                  │
│                                                                               │
```
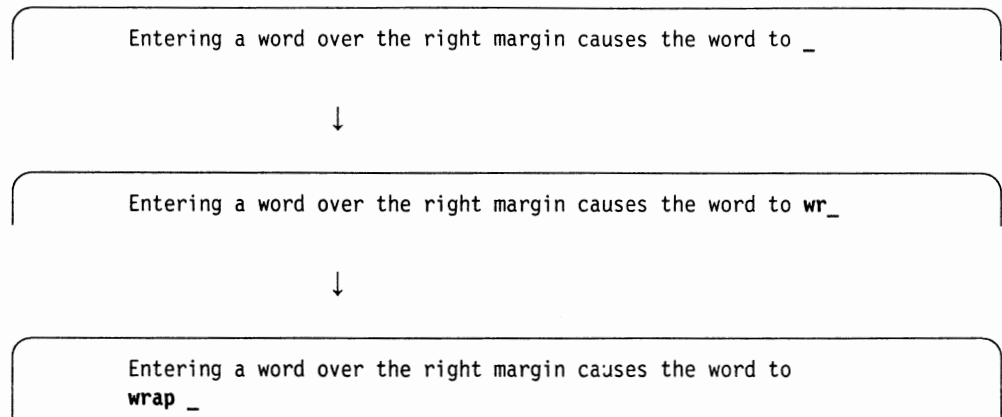
Figure   2-6. Word Wrap to the Next Line

In insert mode, the inserted character causes the existing characters to move to the next position. When the moved words overrun the margins, the words move to the next line.

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                                                                               │
│       Inserting a_ word causes the word to wrap to the next line.             │
│                                                                               │
```

↓

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                                                                               │
│       Inserting another word _causes the word to wrap to the next            │
│       line.                                                                   │
│                                                                               │
```

↓

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                                                                               │
│       Inserting another word again _causes the word to wrap to the           │
│       next line.                                                              │
│                                                                               │
```
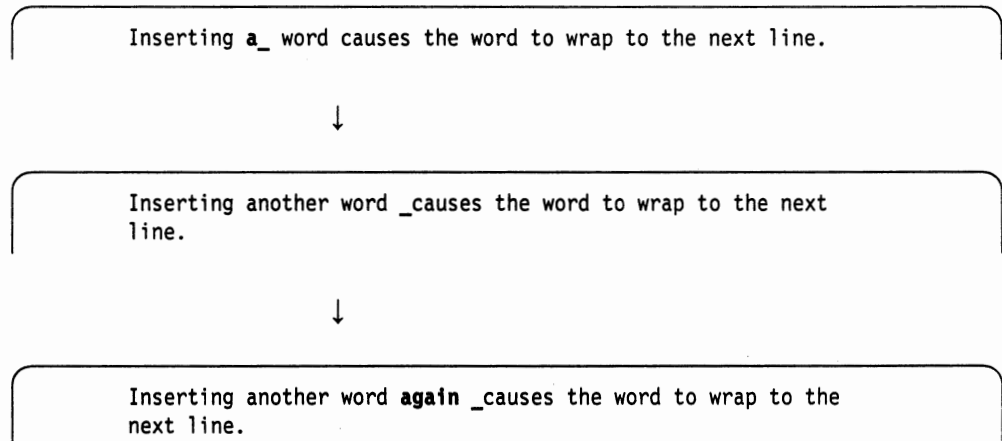
Figure   2-7. Word Wrap in Insert Mode

Note: Enough null-character space must be available in the next line for the word wrap operation. If the next line does not have enough null-character space, the keyboard locks and ✖ ✿ > appears in the operator information area.

Changing Scale Line Origin

You can select the scale line to start from either 0 (Figure 2-8) or 1 (Figure 2-9). To change the scale line origin, place the cursor at the first position of the scale line and press the CrSel key.

```
----+--<-1----+----2----+----3----+----4----+----5----+----6----+----7----+--->
```
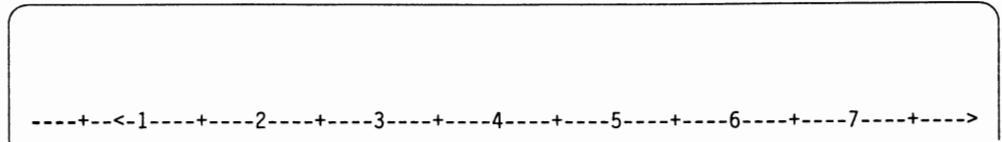
Figure 2-8. Scale Line Starting From 1

```
0----+--<-1----+----2----+----3----+----4----+----5----+----6----+----7----+--->
```
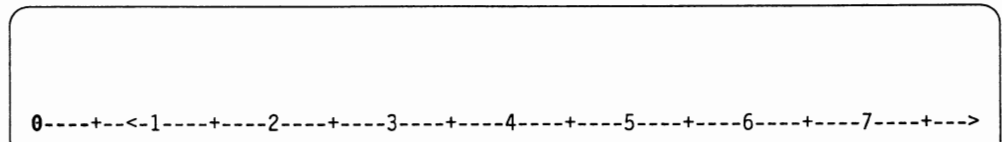
Figure 2-9. Scale Line Starting From 0

Unlocking Margin

You can set the right and left margins to be ignored when the word wrap is turned off. You can set the unlocking margin by placing the cursor at the right margin position and pressing the CrSel key. The " > " changes to "¦".

```
----+--<-1----+----2----+----3----+----4----+----5----+----6->--+----7----+-----
```
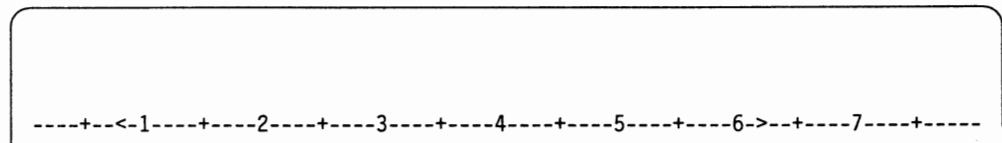
Figure 2-10. Right Margin

```
----+--<-1----+----2----+----3----+----4----+----5----+----6-¦--+----7----+-----
```
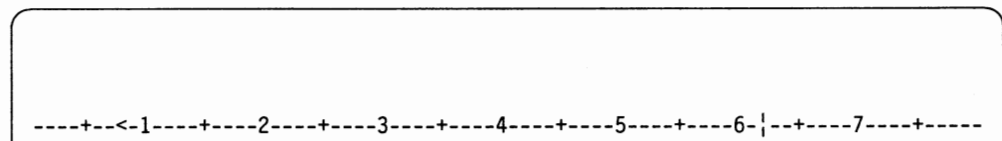
Figure 2-11. Unlocking Right Margin

Home Key

If the Home position that you defined is not within the window, the default home position for the window is effective.

Error-Correcting Backspace

Pressing the error-correcting backspace key moves the cursor to the left and a character at the cursor position is deleted.

Operating in X.21/X.25 Network

When the display station is connected to an X.21/X.25 network via the control unit, the user can connect the display station to a host system that has been pre-defined by control unit customization or a host system that is specified by the user.

Note: This function is available for the AEA host session only.

X.21/X.25 Network Keys

One side of the keyboard overlay has the function key arrangement printed for the X.21/X.25 operation.

Depending on your keyboard layout ID, the following X.21/X.25 network keys are redefined when the ExSel key is pressed:

104/122/124-key keyboard   IBM Enhanced keyboard
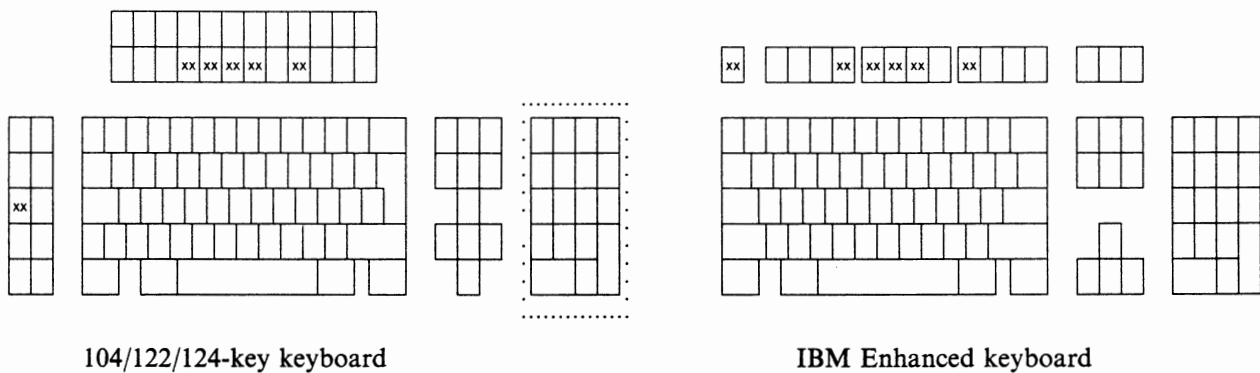
Original key	Redefined key
F4	Direct Call (Direct)
F5	Dial Call (Dial)
F6	Local
F7	Communication (Comm)
F9	Disconnect (Disc)

Note: The host connection procedure is dependant on your local environment. Consult your system coordinator for details. The *IBM 3270 Information Display System X.25 Operation* describes the operation in detail.

The following figure shows the connection mode that has been pre-defined by control unit customization.

- When the display station is powered on, the display station has a path to the host system (in-use mode).

- Pressing the ExSel key and then the Disc key disconnects the display station from the network (disconnect-in-process mode). The display station can then perform local functions (local mode).

- Pressing the ExSel key and then the Comm key reconnects the display station to the host system (in-use mode).

```
                    ┌──────────────┐
 ExSel and Disc     │  In-Use Mode │
                    └──────────────┘
        │
        ▼
┌──────────────────┐
│Disconnect-In-Process│        ▲
│      Mode        │    ExSel and Comm
└──────────────────┘
        │                ┌──────────────┐
        └──────────────▶ │  Local Mode  │
                         └──────────────┘
```
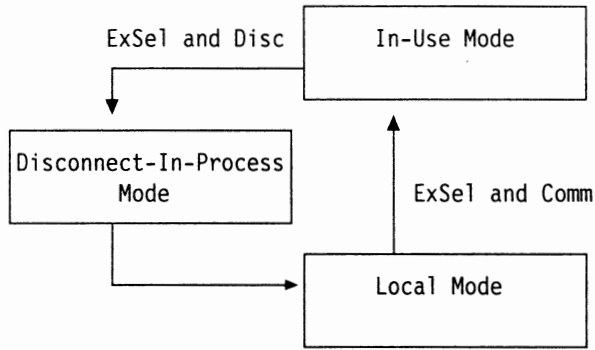
Figure 2-12. Control Unit Pre-defined Connection Modes

The following figure shows that the user can specify the host system to which the display station will be connected.

```
                    ┌──────────────┐
 ExSel and Disc     │  In-Use Mode │◀─────────┐
                    └──────────────┘          │
        │                                      │
        ▼                            ┌──────────────────┐
┌──────────────────┐                 │ Out-Going Call Mode │
│Disconnect-In-Process│              │        or         │
│      Mode        │                 │ In-Coming Call Mode │
└──────────────────┘                 └──────────────────┘
        │         ┌──────────────┐           │
        └───────▶ │  Ready Mode  │           │
        ┌───────▶ │              │◀──────────┘
        │         └──────────────┘      ExSel and Dial - ##
        │              ▲                        or
 ExSel and Local   ExSel and Comm      In-Coming Call from Host
        │         ┌──────────────┐
        └──────── │  Local Mode  │
                  └──────────────┘
```
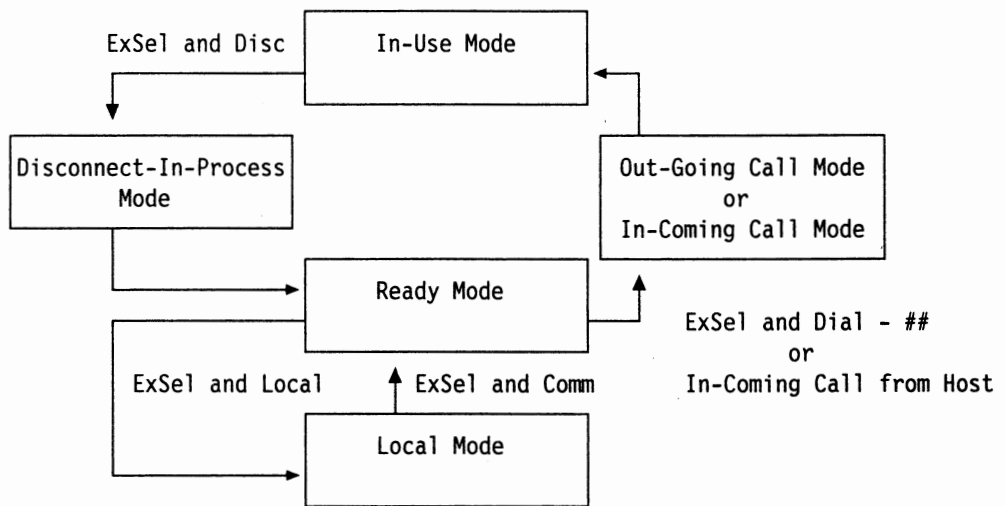
Figure 2-13. User Specified Connection Modes

- When the display station is powered on, the display station can accept both user and host requests to connect (ready mode).

- The display station is connected to a host system (in-use mode) either by an incoming-call from the host; or by pressing the ExSel key, pressing the Dial key, and entering the host system network address (in-coming/out-going call mode).

- Pressing the ExSel key and then the Disc key disconnects the display station from the host system (disconnect-in-process mode). The display station can then accept user and host requests to reconnect (ready mode).

- Pressing the ExSel key and then the Local in ready mode disconnects the display station from the network (local mode).

- Pressing the ExSel key after pressing the Comm key reconnects the display station to the network.

Checking Response Time

You can check the response time of the host system. The following key is redefined as the RTM (Response Time Monitor) key when the ExSel key is pressed and ▶ is present in the operator information area.

One side of the keyboard overlay has the function key arrangement printed for this function.
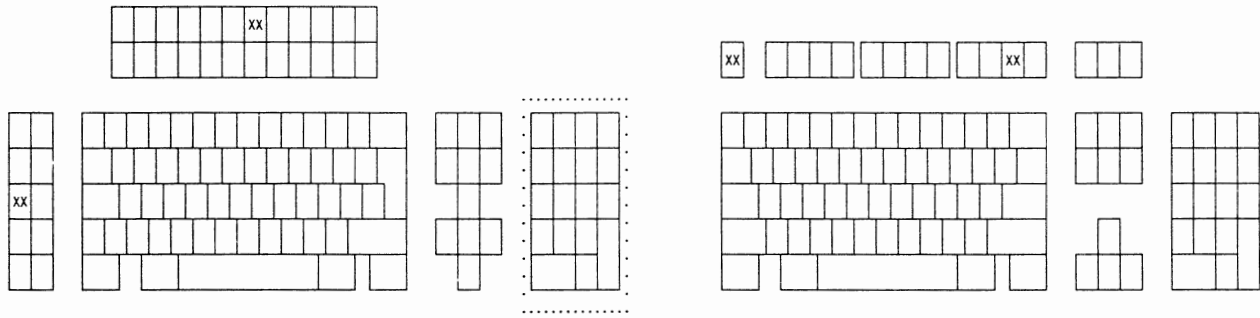
104/122/124-key keyboard   IBM Enhanced keyboard

Note: The control unit should be appropriately customized for this function.

To check the response time of your host system; press the ExSel key, and then the RTM key. You should see one of the following symbols:

✗ ? +	The control unit does not allow the display station to display the response time
⏱ :	The display station is not allowed to display the response time
⏱ :ss.t	"ss" for seconds and "t" for tenths of seconds
⏱ mm:ss	"mm" for minutes and "ss" for seconds
⏱ :??.?	response time monitoring cancelled.

To cancel the response time monitor, press the ExSel key, and then the RTM key again.

Chapter 3. Operator Messages

This section describes the operator messages that appear in the operator information area of the screen. It also describes what the user should do when a particular indicator or a set of indicators appear in the operator information area.

The operator information area is the bottom part of the screen. The *separator line* separates the data area from the operator information area. The following figure shows the location for each group of messages and the separator line on the screen.

```
                                             Separator Line
                                                  ↓
 ┌──────────────────────────────────────────────────────────────────────┐
 │ Readiness    Do-not-enter   Reminder        Shift      Mode     Entry assist
 │ and                         and                        and
 │ System                      Response time              Print status
 │ connection                  monitor
 └──────────────────────────────────────────────────────────────────────┘
```
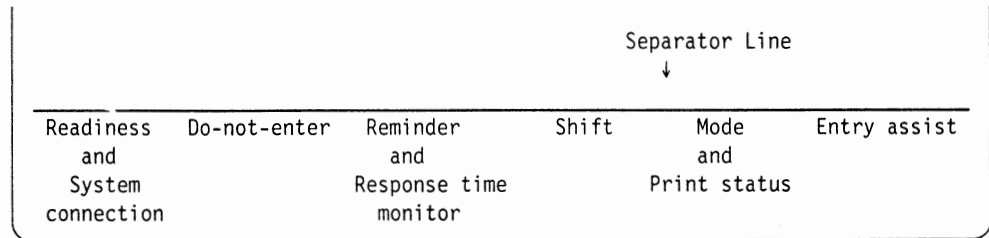
Figure   3-1. Operator Information Area

Summary of System Indicators

Locate the desired symbol, then go to the specified page for details.

Field name	Symbol	Meaning	Page
Readiness and system connection	S	IBM 3174 ready	3-5
	▣	IBM 3274 ready	3-5
	A	Online (Non-SNA)	3-5
	B	Online (SNA)	3-5
	■	My job	3-5
	▣	System operator	3-5
	▢	Unowned	3-5
	N	IBM 9370 processor ready or In-use indicator (X.21/X.25 network adapter feature)	3-5
	TEST	Test mode	3-6
Do-not-enter	✕ SYSTEM	Do not enter - System lock	3-7
	✕ ⅄ NUM	Do not enter - Numeric data only	3-7
	✕ ⚬⌐	Do not enter - Security key	3-7
	✕ ⟍ nnn	Do not enter - Machine check	3-7
	✕ ⟍z⟋ 5nn	Do not enter - Communication check	3-8
	✕ PROG nnn	Do not enter - Program check	3-8
	✕ ⅄ ⟋z⟍	Do not enter - Operator communication check	3-8
	✕ ▭▸⟍	Do not enter - Printer not working	3-8
	✕ ▭▸▭ ⟨	Do not enter - Printer busy	3-8
	✕ ▭▸▭⟨⟨	Do not enter - Printer very busy	3-9
	✕ ⟨	Do not enter - Time (terminal wait)	3-9
	✕ ?+	Do not enter - What?	3-9
	✕ -f	Do not enter - Minus function	3-9
	✕⅄′ +?	Do not enter - Invalid diacritical-mark-key combination	3-9
	✕⅄ˌ+?	Do not enter - Invalid diacritical-mark-key combination	3-9
	✕ ⅄ˋ +?	Do not enter - Invalid diacritical-mark-key combination	3-9
	✕ ⅄~ +?	Do not enter - Invalid diacritical-mark-key combination	3-9
	✕ ⅄∧ +?	Do not enter - Invalid diacritical-mark-key combination	3-9
	✕ ⅄° +?	Do not enter - Invalid diacritical-mark-key combination	3-9
	✕⅄¨+?	Do not enter - Invalid diacritical-mark-key combination	3-9
	✕ ⅄ ♯ ?	Do not enter - What number	3-9
	✕ -S	Do not enter - Minus symbol	3-9
	✕ ⅄>	Do not enter - Too much entered (more than)	3-9
	✕ ←⅄→	Do not enter - Go elsewhere	3-9
	✕⅄✕	Do not enter - Operator unauthorized	3-10
Communication error reminder	⟍z⟋ 5nn	Communication error reminder	3-11
	⟋z⟍	Call ready	3-11
	⟋z⟍ Nnn	Call ready with call progress signal	3-11
	⟋z⟍ ♯?	Dial-in (dialing display station)	3-11
	⟋z⟍ ♯♯♯	Dial-in (other display station, same control unit)	3-11
	▸⟋z⟍	Outgoing call in process	3-11
	▸⟋z⟍ nnn	Outgoing call in process with call progress signal	3-11
	◂⟋z⟍	Incoming call in process	3-11
	⟋z⟍ ⟨	Disconnect in process	3-12

Field name	Symbol	Meaning	Page
	◀─ㄹ─ 599	Local	3-12
	────ㄹ─xxxxx	Call ready with cause and diagnostic codes (xxxxx: Five alpha-numeric characters)	3-12
	─✕ㄹ─xxxxx	X.25 communication reminder with cause and diagnostic codes (xxxxx: Five alphanumeric characters)	3-12
Response time monitor	⟳ :	Response time display unauthorized	3-13
	⟳ :SS.t	Response time short type	3-13
	⟳ mm:SS	Response time long type	3-13
	⟳ :??.?	Response time display canceled	3-13
Shift and modes	⇧	Upper shift	3-14
	A	Caps lock	3-14
	NUM	Numeric Lock	3-14
	∧	Insert mode	3-14
	+Cr	Graphic cursor mode	3-14
	▶	Extended select mode	3-14
	T n	Test option mode	3-14
	⋈	Dim indicator	3-14
	APL	APL mode	3-14
	ALPHA	Alphabetic shift	3-14
	ALPHA ⇧	Alpha-symbol shift	3-14
	カナ	Katakana shift	3-15
	カナ ⇧	Kana-symbol shift	3-15
	🄰	Reverse	3-15
	🌟	Blink	3-15
	a̲	Underscore	3-15
	■	Color	3-15
	🄰	Background Transparent	3-15
	🄰	Background Non-Transparent	3-15
	S0	Base Character Set	3-15
	PSa (a: A′ or B)	Program Symbol Set	3-16
Printer status	▭—▭ _ _	Assign printer	3-17
	▭—■ nn	Printer printing	3-17
	▭—✦ nn	Printer failure	3-17
	▭—▭ ??	What printer	3-17
	▭—▭ nn	Printer assignment	3-17
Entry assist function	DOC	Document mode	3-18
	⇩	Word wrap	3-18
Error indicator	L	Logic element is failing	5-1
	K	Keyboard is failing	5-1
	LK	Logic element or keyboard is failing	5-1
	nn	Display station error number	3-19
	- f	Invalid sequence key	3-19
	←⋏→	Go elsewhere	3-19
	? +	Invalid target key	3-19
	⋏<	No key sequence	3-19
	⋏>	Record table full	3-19

Field name	Symbol	Meaning	Page
	2%%	Keyboard layout (type) ID or operational mismatch	3-19
Record/play	RECRD	Record Mode	3-20
	R	Record	3-20
	R 𝕏⌃	Record suspend	3-20
	PLAY	Play Mode	3-20
	P	Play	3-20
	P 𝕏⌃	Play suspend	3-20
	⊞ ⊞ ⊞	Record-ID Key Position and Status	3-20
	F nn	Record-ID number	3-20
Local indi-cator	SETUP	Setup Mode	3-21
	an	Current session short name and screen profile (a: A-Z, n:0-2)	3-21
	MOVE	Window move	3-21
	SIZE	Window change size	3-21
	BASE	Base color	3-21
	BKGND	Window background	3-21
	PRINT	Print setup	3-21
	CTRL	Print control	3-21
	SCRN	Print screen	3-21
	TRIM	Print trim	3-21
	COPY	Copy mode or keyboard definition - copy	3-21
	SOURC	Copy source definition	3-21
	TARGT	Copy target definition	3-21
	◘↔☐	Window enlarged	3-21
	XCHNG	Keyboard definition - exchange	3-22
	DELET	Keyboard definition - delete	3-22
	FULL	Keyboard definition - full	3-22
	PARTIAL	Keyboard definition - partial	3-22
	SAVE	Keyboard definition - save	3-22
	↔↕	Cursor move	3-22
	rrr/cc	Cursor position	3-22

Readiness and System Connection

```
┌────────────────────────────────────────────────────────────────────────────┐
│                                                                              │
│ Readiness   Do-not-enter   Reminder        Shift      Mode         Entry assist │
│   and                        and                       and                    │
│ System                   Response time              Print status             │
│ connection                  monitor                                          │
└────────────────────────────────────────────────────────────────────────────
```

Symbol	Meaning	Description
S	IBM 3174 ready	The display station is connected to the IBM 3174 Subsystem Control Unit.
4	IBM 3274 ready	The display station is connected to the IBM 3274 Control Unit.
A	Online A	The communication method between the host system and the control unit is not Systems Network Architecture (SNA). Pressing the Test key or sending data to or receiving data from the host system turns off this symbol.
B	Online B	The communication method between the host system and the control unit follows the Systems Network Architecture.
▮	My job	The display station is connected to an application program.
☒	System operator	The display station is connected to the System Services Control Point. You can connect your display station to an application program by entering a command, or pressing the SysRq key while holding down the Alt key.
?	Unowned	The display station is not connected to an application program or the System Services Control Point.
N	IBM 9370 Processor ready or In-use indicator	The display station is connected to either the IBM 9370 Processor or a host system via the X.21/X.25 network. Refer to "Operating in X.21/X.25 Network" on page 2-47 for details.

Symbol	Meaning	Description
TEST	Test mode	There are two types of test modes: offline and online.

In the offline test mode, the display station displays the following test pattern. To enter this mode, select "Test display station" in the "Offline Setup" panel.

```
3472                          0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ

AA0012345

0151   09F4600   09F4602      AAAAAAAA      AAAAAAAA      AAAAAAAA

       09F4601   09F4603      AAAAAA^A      AAAAAAAA      AAAAAAAA

10111111 10111111             AAAAAAAA      AAAAAAAA      AAAAAAAA

-                             ██████        ██████        ██████




Reset=Exit

TEST
```

Note: The numbers and characters that appear in the test pattern may be different from the ones shown. The test pattern is dependant on the display station.

In the online test mode, the display station is under the control of the control unit's test program. To enter this mode, press the Test key while holding down the Alt key through the AEA session. Refer to *IBM 3174 Subsystem Control Unit Help Desk Reference* or *IBM 3274 Control Unit Description and Programmer's Guide* for details.

Do-not-enter

Readiness and System connection	**Do-not-enter**	Reminder and Response time monitor	Shift	Mode and Print status	Entry assist

The Do-not-enter symbol **✗** indicates that the display station will not accept input from the keyboard. Symbols shown at the right of **✗** explain the reason. All of the keys are locked, except for the functional keys including the following keys:

Alt, AltCr, Attn, CrBnk, ExSel, Quit, Reset, Shift (⇧), SysRq, or Test key.
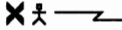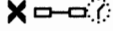
Pressing the Reset key removes most of the do-not-enter symbols.

The sound status change of the audible clicker indicates the do-not-enter condition. You can turn on and off the clicker as described in Appendix A, "Setup Mode and Printer Control Operations" on page A-1.

- If the clicker is on, and pressing a key does not sound the audible clicker, a do-not-enter condition locks the keyboard.
- If the clicker is off, and pressing a key sounds the audible clicker, a do-not-enter condition locks the keyboard.

The following descriptions tell how to turn off the symbol and unlock the keyboard.

Symbol	Meaning	Description
✗ SYSTEM	System lock	Cannot enter any data. The application program locked the keyboard. Pressing the Reset key removes this symbol and unlocks the keyboard.
✗ ↥ NUM	Numeric data only	A non-numeric character (other than 0 through 9, a period, a comma, or a minus sign) key in a numeric field was pressed. This specific field is active only if the numeric-lock is set to on. Pressing the Reset key removes this symbol and unlocks the keyboard.
✗ ⌐	Security key	This symbol indicates that the security key has locked the display station. The screen is blank (except the operator information area and the cursor) and the display station cannot accept any data. To remove this symbol, insert the security key into the keylock, and turn the key fully clockwise.
✗ ↘ nnn	Machine check	There is a problem with the display station or the control unit. Refer to "Error Code Charts" on page B-22.

Symbol	Meaning	Description
✗ ━ヽz━ 5nn	Communication check	There is a problem with the communication line between the display station and the host system.
		You tried to send data to the host system while the communication error reminder was displayed in the operator information area. The error code **5nn** defines the type of problem that occurred. Press the **Reset** key to remove this symbol and to unlock the keyboard.
		Refer to the *IBM 3174 Subsystem Control Unit Help Desk Reference* or the *IBM 3274 Control Unit Description and Programmer's Guide* for the definition of nn.
✗ PROGnnn	Program check	The control unit has detected an error in the data from the host system. This symbol may appear because the application program is the wrong one for the display station. Press the **Reset** key to remove this symbol and to unlock the keyboard.
		Refer to the *IBM 3174 Subsystem Control Unit Help Desk Reference* or the *IBM 3274 Control Unit Description and Programmer's Guide* for the definition of nn.
✗ ⚹ ━z━	Operator communication check	You requested an X.21/X.25 function that is currently not allowed. Press the **Reset** key to remove this symbol and to unlock the keyboard.
✗ ▭━↘	Printer not working	The printer assigned to the display station is not working and no other printers in the same class are available.
		If ▭━◀ nn is not present, and ✗ ▭━↘ appears after you press the **Print** key, the printer assigned to the display station (or the most available printer in the class) is not working. Pressing the **Quit** key to cancel the print request will unlock the keyboard.
		Pressing the **Reset** key will have no effect. If ▭━◀ nn is present in the operator information area, the printer stopped during the last print operation.
		The symbol ✗ ▭━↘ may also appear if a host system requested print operation is in process.
✗ ▭━▭ ⦂⦂	Printer busy	The printer assigned to the display station is busy with the local printing job. If ▭━■ nn appears with this symbol, while the printing is in process, the user has two options: wait for the process to complete, or press the **Quit** key. Pressing the **Quit** key:
		• Cancels the request if it has not started, or cancels the remainder of the job if it has started
		• Erases ✗ ▭━▭ ⦂⦂
		• Unlocks the keyboard.
		If you press the **Quit** key while the printer is printing by a request from the host system, ✗ ⦂⦂ replaces this symbol.
		Note: This symbol may flash on and off after the printing has started. Pressing the **Reset** key has no effect.

Symbol	Meaning	Description
✖ ▭—▭ ⁇	Printer very busy	This symbol means the same as ✖ ▭—▭ ⁇, except that more time is expected before the printing job from the host system is complete. The Reset key has no effect.
✖ ⁇	Time (terminal wait)	The host system or the control unit needs more time to respond to your request. If the symbol is displayed for more than a few minutes, you should call your system coordinator for help.
✖ ? +	What?	The display station did not accept the last input. Make sure the operation is correct. One of the following caused this symbol to appear: • The display station did not recognize the entered data. • The diacritical-mark-key or character-key input was not complete. • You pressed a key while a do-not-enter symbol ✖ was present. • You pressed the Response Time Monitor (RTM) key when the RTM functions are disabled.
✖ -f	Minus function	An unavailable keyboard function was requested. Press the Reset key to unlock the keyboard.
✖ 옷′+? ✖ 옷,+? ✖ 옷`+? ✖ 옷~+? ✖ 옷^+? ✖ 옷°+? ✖ 옷¨+?	Invalid diacritical-mark-key combination	An invalid diacritical-mark-key and character-key combination was entered. Press the Reset key to unlock the keyboard and enter a correct diacritical-mark-key and character-key combination again.
✖ 옷 ♯ ?	What number	The Ident key was pressed and an incorrect printer number was entered. This symbol appears when a selected printer number is not numeric or is not defined. Pressing the Reset key removes this symbol and unlocks the keyboard.
✖ - S	Minus symbol	An unsupported key was pressed. Pressing the Reset key removes this symbol and unlocks the keyboard. This symbol may be caused by an invalid diacritical-mark-key and character-key input.
✖ 옷 >	Too much entered (more than)	You tried to insert characters into an input field that had no space for the characters. Even if you see spaces for the characters to be inserted, there may be blank characters that you have to delete. Pressing the Reset key removes this symbol and unlocks the keyboard.
✖ ←옷→	Go elsewhere	You tried to: • Enter, insert, erase, or delete a character when the cursor is not in an input field. • Use the CrSel key when the cursor is not in a detectable field. Pressing the Reset key removes this symbol and unlocks the keyboard.

Symbol	Meaning	Description
✖ ✚ ✖	Operator unauthorized	The display station is not allowed to do the printer-related functions that you requested. One of the following caused this symbol to appear:

- You pressed the Print key without entering the printer number in ▭—▭ nn, or ▭—▭ ?? is present.
- You pressed the Ident key and the control unit has no printer assigned.
- The number you entered is defined by the control unit, but is not allowed for your display station.
- When you pressed the Print key, the printer assigned to your display station is actually another display station.
- The printer is unable to accept all of the contents of a display during local-printing.

Pressing the Reset key removes this symbol and unlocks the keyboard.

Communication Error Reminder

Readiness	Do-not-enter	**Reminder**	Shift	Mode	Entry assist
and		and		and	
System		Response time		Print status	
connection		monitor			

Symbol	Meaning	Description
—⌐ 5nn	Communication error reminder	The control unit detected a communication link error between the control unit and the host system. This condition occurs when: • The control unit detects a permanent error in the communication line with the host system. The symbol appears on all display stations attached to the control unit. • A communication line error was detected. The display station restores its previous contents and requests the host system to resend the error data. The symbol appears only on the affected display station. Error number 5nn defines the type of problem that occurred.
—⌐	Call ready	The control unit is in X.21/X.25 ready state. The display station is ready to communicate with a host system via the X.21/X.25 network.
—⌐ nnn	Call ready with call progress signal	A call request is in process but the connection has not been completed. Refer to *IBM 3174 Subsystem Control Unit Help Desk Reference* or *IBM 3274 Control Unit Description and Programmer's Guide* for the reason which nnn indicates.
—⌐ # ?	Dial-in (dialing display station)	You pressed the ExSel key, then pressed the DIAL key at the display station; these steps attempted to dial a host system via the X.21/X.25 network. The control unit is now waiting for the dial numbers (the network address of the dialing host system) to be keyed-in.
—⌐ ###	Dial-in (other display station, same control unit)	This symbol is present at display stations which are connected to the same control unit as display stations trying to dial a host system via the X.21/X.25 network.
—⌐	Outgoing call in process	You pressed the Enter key after keying in the dial numbers for the dial-in symbol, and call request was in process.
—⌐ nnn	Outgoing call in process with call progress signal	The outgoing call is in process, but the connection is not being made. Refer to *IBM 3174 Subsystem Control Unit Help Desk Reference* or *IBM 3274 Control Unit Description and Programmer's Guide* for the reason which nnn indicates.
—⌐	Incoming call in process	This symbol appears when the control unit has been addressed by the network and is answering an incoming call.

Symbol	Meaning	Description
—z— :(:	Disconnect in process	Disconnection from the network is in process because: • You pressed the ExSel key, then pressed the DISC key • The control unit received a disconnect command from the network • A timeout condition occurred.
—z—599	Local	You pressed ExSel key, then pressed the LOCAL key. The control unit is offline to the local operation network.
—z— xxxxx	Call ready with cause and diagnostic codes	An error occurred and five alphanumeric characters are displayed at the right of the call ready symbol. These characters indicates the cause. Refer to *IBM 3174 Subsystem Control Unit Help Desk Reference* or *IBM 3274 Control Unit Description and Programmer's Guide* for details.
—z— xxxxx	X.25 communication reminder with cause and diagnostic codes	An error occurred and five alphanumeric characters are displayed at the right of the communication reminder symbol. These characters indicates the cause. Refer to *IBM 3174 Subsystem Control Unit Help Desk Reference* or *IBM 3274 Control Unit Description and Programmer's Guide* for details.

Response Time Monitor
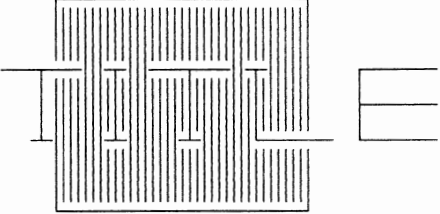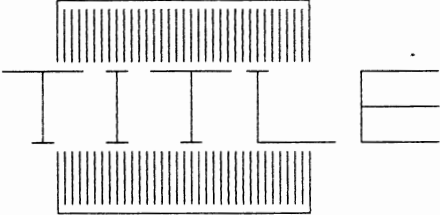
| Readiness and System connection | Do-not-enter | Reminder and **Response time monitor** | Shift | Mode and Print status | Entry assist |

Symbol	Meaning	Description
☼ :	Response time display unauthorized	The display station is not allowed to display the response time by the host system, although the control unit enabled the response time monitor.
☼ :ss.t	Response time short type	This symbol shows the time required for the last data transmission to the host system (ss for seconds and t for tenths of seconds). This symbol remains displayed until a new response time monitor symbol is displayed.
☼ mm:ss	Response time long type	This symbol shows the time required for the last data transmission to the host system (mm for minutes and ss for seconds). The symbol remains displayed until a new response time monitor symbol is displayed.
☼ :??.?	Response time display canceled	The current response time measurement was canceled.

Shift and Modes

	Readiness and System connection	Do-not-enter	Reminder and Response time monitor	**Shift**	**Mode** and Print status	Entry assist

Symbol	Meaning	Description
⇧	Upper shift	Alpha characters entered from the keyboard will appear in upper-case characters. If the key has two characters or symbols on its keytop, the symbol on the top part of the keytop is displayed.
A	Caps lock	Alphabetic characters and accented characters appear in capital letters.
NUM	Numeric	The numeric lock function is on and the cursor is in a numeric field. Only numeric characters such as 0 through 9, a period, a comma, or a minus sign can be entered.
∧	Insert mode	The keyboard is in insert mode. A character may be inserted at the cursor position. The insert mode can be turned off by pressing one of the following keys. **Reset, Test, SysRq, Enter, Clear, PA, Fnn**, or â (in document mode).
+Cr	Graphic cursor mode	This symbol indicates that the cursor blink and alternate cursor keys will affect the graphic cursor. When the application program specifies the cursor move keys to move the graphic cursor, this symbol also indicates that the cursor move keys will affect the graphic cursor position. Pressing the +Cr key places the display station in alphanumeric cursor mode.
▶	Extended select mode	The Extended Select (**ExSel**) key was pressed and the keyboard is in extended select mode. This mode redefines the program function key functions. Pressing any key (except the Alt keys) exits from this mode.
T n	Test option mode	The **Test** key was pressed and the display station is in test mode.
⋈	Dim indicator	You have not pressed any key or the display station has not received any data for the number of minutes that was specified in setup mode. The screen becomes blank and pressing any key returns the display contents.
APL	APL mode	The display station is in APL mode.
ALPHA	Alphabetic shift	The keyboard is in alphabetic shift. This symbol appears only when the Japanese Katakana keyboard is attached to the display station.
ALPHA ⇧	Alpha-symbol shift	The keyboard is in alpha-symbol shift. This symbol appears only when the Japanese Katakana keyboard is attached to the display station.

Symbol	Meaning	Description
カナ	Katakana shift	The keyboard is in Katakana shift. This symbol appears only when the Japanese Katakana keyboard is attached to the display station.
カナ⇧	Kana-symbol shift	The keyboard is in Kana-symbol shift. This symbol appears only when the Japanese Katakana keyboard is attached to the display station.
🄴	Reverse	The current display is in reverse state. The subsequent entered data will be reversed on the display.
※	Blink	The current display is in blink state. The subsequent entered data will blink on the display.
a̲	Underscore	The current display is in underscore state. The subsequent entered data will be underscored on the display.
■	Color	The current display is in the color state. The subsequent entered data will appear in the color of "■" on the display.
🄱	Background Transparent	The display station is in background transparent mode. The graphics on the display are visible through the characters as follows. If ▶ appears the next column of 🄱, this background transparent field is defined by the host application program.
🄰	Background Non-Transparent	The display station is in background non-transparent mode. The graphics on the display are not visible through the characters as follows. If ▶ appears the next column of 🄰, this background non-transparent field is defined by the host application program. Displaying ⴰ at the next column of 🄰 indicates that you have selected the background non-transparent.
S0	Base Character Set	The display station is using the base character set which is available for the display station.

Symbol	Meaning	Description
PSa (a: A or B)	Program Symbol Set	The display station is using the program symbol set which is loaded from the host. If ▶ appears the next column of PSa (a: A or B), this program symbol set is defined by the host application program. Displaying ⊼ at the next column of PSa (a: A or B) indicates that you have selected the program symbol set.

Printer Status

Readiness	Do-not-enter	Reminder	Shift	Mode	Entry assist
and		and		and	
System		Response time		**Print status**	
connection		monitor			

Symbol	Meaning	Description
▫—▫ _ _	Assign printer	The Ident key was pressed. You can assign a printer by keying in the printer number in place of _ _.
▫—■ nn	Printer printing	The printer identified by nn is printing the display station's data.
▫—◄ nn	Printer failure	The printer identified by nn has stopped while printing the display station data. This symbol remains on until you clear the condition or press the Quit key.
▫—▫ ??	What printer	The printer assignment has been changed. Pressing the Ident key displays a new printer assignment.
▫—▫ nn	Printer assignment	The display station can use the printer address number nn. Possible nn numbers are: • 1 through 47: individual printer port number • 70 through 85: printer class number • 99: local printer

Entry Assist Function

Readiness and System connection	Do-not-enter	Reminder and Response time monitor	Shift	Mode and Print status	**Entry assist**	

Symbol	Meaning	Description
DOC	Document mode	The display station is in document mode. For more details about the document mode, refer to "Making Entry and Edit More Effective" on page 2-43.
⇓	Word wrap	The word wrap (automatic new line) function is enabled. For more details about the word wrap function, refer to "Making Entry and Edit More Effective" on page 2-43.

Error Indicator

```
┌─────────────────────────────────────────────────────┐
│ ──────────────────────────────────────────────────  │
│                                                      │
│                  Error Indicator                     │
│                                                      │
│                                                      │
└─────────────────────────────────────────────────────┘
```

Symbol	Meaning	Description
nn	Error number	This number is displayed with error indicators. The number shows the service representatives the type of problem that occurred.
- f	Invalid key	You pressed an invalid key for the record/play function. Pressing the correct key clears the symbol.
←⊀→	Go elsewhere	You tried to enter characters in the non-display field when the non-display field record/play operation is prohibited.
? +	Invalid target key	You pressed a key that key strokes can not be assigned to. This symbol also appears when you try to copy display contents to the session when a do-not-enter symbol is displayed in the operator information area. Pressing the correct key clears the symbol.
⊀<	No key sequence	The key that you pressed has no key strokes assigned. Pressing the correct key clears the symbol.
⊀>	Record table full	You cannot record any more key strokes. If more key strokes are required to be recorded, you have to delete some recorded key strokes that are assigned to another key.
2%%	Keyboard layout (type) ID or opera-tional mismatch	The keyboard layout ID in the setup panel may not match the ID that is defined during the control unit customization. You may need to check the keyboard layout ID in the setup panel or the control unit customization.
		This message is also displayed when the control unit customization for items other than the keyboard layout ID is not appropriate. Contact the system coordinator.

Record/Play

```
Record/Play
```
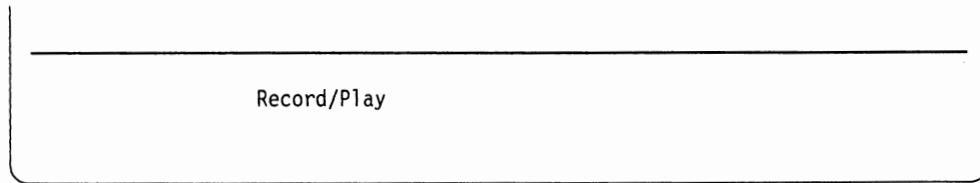
Symbol	Meaning	Description
RECRD	Record Mode	The display station is in record mode.
R	Record	The number at the right of "R" indicates approximately how many key strokes you can record. Refer to "Recording and Playing Keystrokes" on page 2-36 for details.
R ⚡∿	Record suspend	You pressed the Pause key and the key stroke recording is temporarily stopped. By pressing the Record key again, the display station continues to record the key strokes. Refer to "Recording and Playing Keystrokes" on page 2-36 for details.
PLAY	Play Mode	The display station is in play mode.
P	Play	When you press the upper group key, the recorded key strokes start replaying. If you press the Quit key while replaying, the display station exits to normal mode. Refer to "Recording and Playing Keystrokes" on page 2-36 for details.
P ⚡∿	Play suspend	Replaying the recorded key strokes temporarily stops. You can do normal operations until you press the Play key. Refer to "Recording and Playing Keystrokes" on page 2-36 for details.
⊞ ⊞ ⊞	Record-ID Key Position and Status	This indicator shows which key has already been assigned (by a solid box) the key strokes. Refer to "Recording and Playing Keystrokes" on page 2-36 for details.
F nn	Record-ID key number	The number at the right of "F" indicates the record-ID key number.

Local Indicators

```
┌─────────────────────────────────────────────────────────────────────┐
│                                                                       │
│   ┌───────────────────────────────────────────────────────────────┐  │
│   │                                                                 │  │
│                      Local Indicators                                 │
│                                                                       │
│                                                                       │
└───────────────────────────────────────────────────────────────────────┘
```

Symbol	Meaning	Description
SETUP	Setup Mode	The display station is in setup mode. You can set various display station characteristics. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1 and Chapter 2, "Operations" on page 2-1 for details of setup operation.
an	Current session short name and screen profile (a: A-Z, n:0-2)	"a" is a session short name that is defined in the "Customization" panel. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1. "n" is the current screen profile number. Refer to "Managing Window Characteristics" on page 2-18 for details of the screen profile.
MOVE	Window move	You can move the window using the cursor move keys.
SIZE	Window change size	You can change the size of the window. Refer to "Sizing and Moving Window" on page 2-16 for the operation.
BASE	Base color	You can change the base color assignment. Refer to "Base Color" on page 2-24 for details.
BKGND	Window background	By pressing a color key, for example the Red key (F13 while holding down Alt key), changes the color of the window background. Refer to "Changing Screen Colors" on page 2-22.
PRINT	Print setup	The display station is in print mode.
CTRL	Printer control	The print control panel is displayed. Refer to "Printer Control" on page A-29.
SCRN	Print screen	The display station is in whole screen print mode. Refer to "Local Print (whole screen)" on page 2-34.
TRIM	Print trim	The display station is in partial screen print mode. Refer to "Local Print (partial screen)" on page 2-35.
COPY	Copy mode or keyboard definition - copy	The display station is in copy mode. If you are in the changing keyboard layout operation, refer to Appendix C, "Keyboard Definition Utility" on page C-1. Otherwise refer to "Copying Screen Contents" on page 2-27.
SOURC	Copy source definition	The display station is in copy source mode. Refer to "Copying Screen Contents" on page 2-27.
TARGT	Copy target definition	The display station is in copy target mode. Refer to "Copying Screen Contents" on page 2-27.
◰↔▢	Window enlarged	The display station displays the session in full screen. Refer to "Windowing Screen and Enlarging Window" on page 2-20.

Symbol	Meaning	Description
XCHNG	Keyboard definition - exchange	The display station is in exchange mode of the keyboard definition function. Refer to Appendix C, "Keyboard Definition Utility" on page C-1.
DELET	Keyboard definition - delete	The display station is in delete mode of the keyboard definition function. Refer to Appendix C, "Keyboard Definition Utility" on page C-1.
FULL	Keyboard definition - full	The display station is in full shift mode of the keyboard definition function. Refer to Appendix C, "Keyboard Definition Utility" on page C-1.
PARTIAL	Keyboard definition - partial	The display station is in partial shift mode of the keyboard definition function. Refer to Appendix C, "Keyboard Definition Utility" on page C-1.
SAVE	Keyboard definition - save	The display station is in save mode of the keyboard definition function. Refer to Appendix C, "Keyboard Definition Utility" on page C-1.
⬦	Cursor move	This symbol instructs the use of cursor move keys in some local functions.
rrr/cc	Cursor position	This symbol shows the current row and column position of the cursor.

Chapter 4. Keyboard and key functions

This section describes the function of each key on the keyboard.

The following figures show the U.S. English, 122-key typewriter, and IBM Enhanced keyboard layouts.
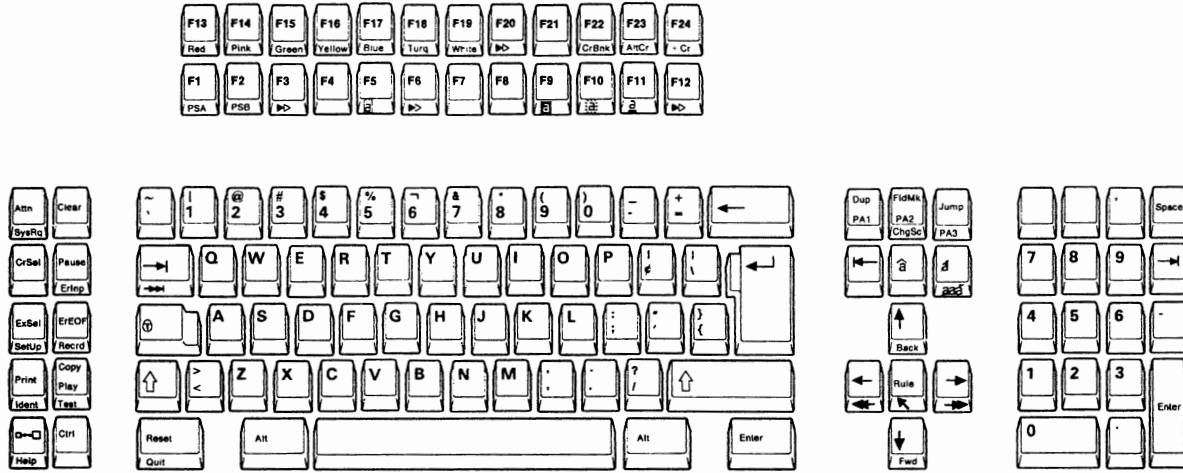
Figure   4-1. 122-key Typewriter Keyboard Layout (U.S. English)
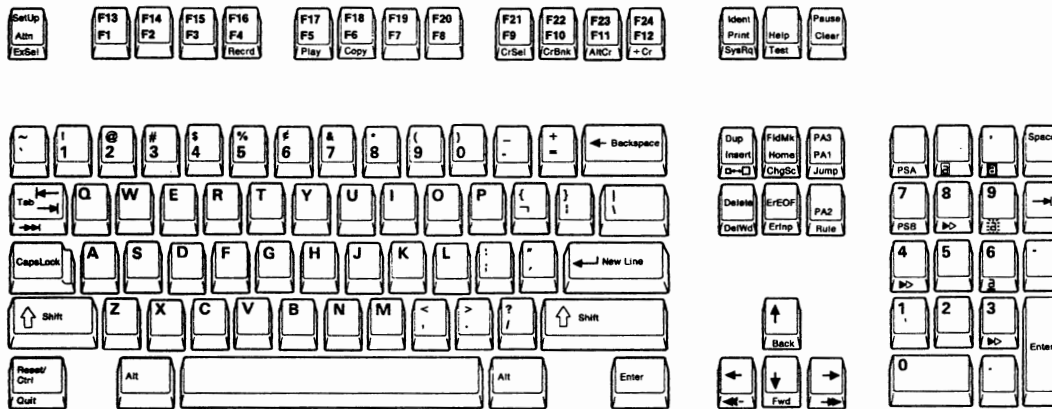
Figure   4-2. IBM Enhanced Keyboard Layout (U.S. English)

Quick Reference Table of Key Functions

Locate the desired key, then go to the specified page for details.

Group name	Key	Page
Keyboard control keys	Alternate (Alt)	4-5
	Caps Lock	4-5
	Reset	4-5
	Extended Select (ExSel)	4-6
	Katakana Shift (カナ, 英数, 英記号, カナ記号, and 英数/カナ)	4-7
Typewriter type keys	Alphabetic	4-8
	Backspace (←)	4-8
	Diacritical Mark	4-9
	Numeric	4-10
	Punctuation Mark	4-10
	Shift Lock (⊕)	4-10
	Space	4-10
	Space Bar	4-10
	Symbols	4-10
	Upper Shift (⇧)	4-10
Cursor control keys	Backtab (←)	4-11
	Alternate Cursor (AltCr)	4-11
	Cursor (↑, ↓, ←, and →)	4-12
	Cursor Blink (CrBnk)	4-12
	Cursor Home (↖ or Home)	4-12
	Graphic cursor (+Cr)	4-13
	New Line (←)	4-13
	Next/Previous Word (→/←)	4-13
	Tab (→)	4-13
Screen control keys	Clear	4-14
	Delete Character (a or Delete)	4-14
	Delete Word (aaa or DelWd)	4-14
	Duplicate (Dup)	4-15
	Erase End-of-field (ErEOF)	4-15
	Erase Input-field (ErInp)	4-15
	Field Mark (FldMk)	4-15
	Insert (â or Insert)	4-16
	Change Screen (ChgSc)	2-18
	Rule (Rule)	4-16
	Jump	4-16
	Program Symbol Set (PSA/PSB)	4-16
	Program Symbol Set Field Inherit (▶)	4-17
	Background Non-Transparent (ⓐ)	4-17
	Background Transparency Field Inherit (▶)	4-17
	Color (Red, Pink, Green, Yellow, Blue, Turq, White, Black)	2-21
	Color Field Inherit (▶)	2-21
	Highlighting (ⓔ-reverse, ☀-blink, ⓐ-underscore)	2-21
	Highlighting Field Inherit (▶)	2-21
	Windowed/Enlarged Mode (▫↔□)	2-20
Local function keys	Quit	4-19
	Print	4-18

Group name	Key	Page
	Print ID (Ident)	4-18
	SetUp	4-19
	Record	2-36
	Play	2-36
	Pause	2-36
	Copy	4-19
	Help	4-19
Test key	Test	4-20
Host function keys	Attention (Attn)	4-21
	Cursor Select (CrSel)	4-21
	Enter	4-21
	Function (Fn)	4-21
	Program Access (PAn)	4-22
	System Request (SysRq)	4-22
Entry assist function keys	Change Format (Chg Fmt)	4-23
	Document On/Off (DOC On/Off)	4-23
	Word Wrap On/Off (Wrap)	4-23
	Error-Correcting Backspace (←)	4-24
X.21/X.25 network function keys	Communication	2-47
	Dial Call	2-47
	Direct Call	2-47
	Disconnect	2-47
	Local	2-47
Response time monitor key	Response time monitor On/Off (RTM)	4-25
APL key	APL On/Off (APL)	4-26

How to select the upper and alternate position of key labels

Some keys have combination of characters, symbols, and labels printed on their key-top. To enter the one on the lower half, press the key alone. To enter the upper half, press and hold the upper shift (⇧) key then press the desired key.

| ———————— Press and hold the ⇧ key before pressing the key.
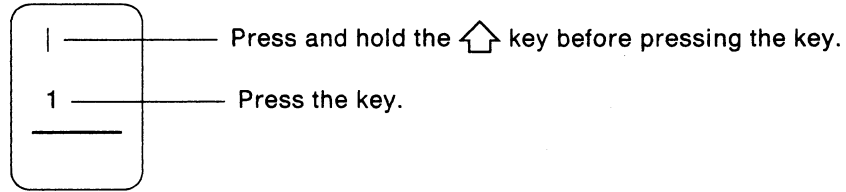
1 ———————— Press the key.

Some keys have combination of characters, symbols, and labels printed on both the top and the front of the key. To enable the top function, press the key alone. To enable the front function, press and hold the alternate (Alt) key then press the desired key.

Attn ———————— Press the key.

SysRq ———————— Press and hold the Alt key before pressing the key.
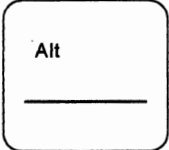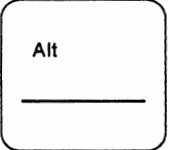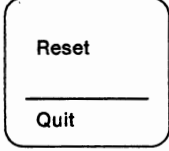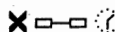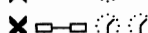
Keyboard Control Keys

104/122/124-key keyboard

IBM Enhanced keyboard

Typewriter keyboard	Enhanced keyboard	Description
Alternate Shift Alt	Alt	Some keys have names printed on the front of the keys. To activate the function, the key must be pressed while pressing and holding the Alt key.
Caps Lock	Caps Lock	When you press this key, the display station enters Caps Lock mode. Alphabetic characters and accented characters will appear as capital letters.
Reset Reset Quit	Reset/ Ctrl Quit	The Reset key: • Causes the display station to leave insert mode and removes the symbol ∧. • Cancels a diacritical-mark key and character key input, leaving a stand-alone accent at the cursor position. • Unlocks the keyboard and removes the do-not-enter symbols ✗ currently displayed in the operator information area except: **Security key** ✗ ⚬⌐ **Terminal wait** ✗ ⊘ **Printer busy** ✗ ☐—☐ ⊘ **Printer very busy** ✗ ☐—☐ ⊘ ⊘ **Printer Not Working** ✗ ☐—↘.

Typewriter keyboard	Enhanced keyboard	Description
Extended Select ExSel SetUp	SetUp Attn ExSel	When you press the ExSel key, ▶ appears in the operator information area and the designated functions will change for the following function keys.

- 104/122/124-key keyboard

F4	Direct call key*
F5	Dial call key*
F6	Local key*
F7	Communication key*
F8	APL On/Off key
F9	Disconnect key*
F13	Document On/Off (DOC On/Off) key
F14	Word wrap On/Off (Wrap) key
F15	Change format (ChgFmt) key
F19	Response time monitor (RTM) key

- IBM Enhanced keyboard

F1	Document On/Off (DOC On/Off) key
F2	Word wrap On/Off (Wrap) key
F3	Change format (ChgFmt) key
F4	Direct call key*
F5	Dial call key*
F6	Local key*
F7	Communication key*
F9	Disconnect key*
F11	Response time monitor (RTM) key

While ▶ is present, the function keys, other than those shown above, do not function when pressed.

Pressing any key (except the Alt keys) clears the symbol (▶).

* These keys function for the AEA host session.

Typewriter keyboard	Enhanced keyboard	Description

Katakana Shift — Japanese Katakana keyboard only.

The Japanese Katakana keyboard has four shift modes for the data character keys. The current shift status is indicated in the operator information area as follows:

Shift	Symbol
Alpha	ALPHA
Alpha symbol	ALPHA ⇧
Kana	カナ
Kana symbol	カナ ⇧

In power-on, the keyboard is set to Alpha shift.

Depending on the keyboard type, the Katakana keys control the shift modes as follows:

- 124-key Typewriter Japanese Katakana keyboard:

  The 英数, 英記号, カナ, and カナ記号 keys place the keyboard in Alpha, Alpha symbol, Kana, and Kana symbol modes, respectively. The keyboard remains in that shift mode until another Katakana shift key is pressed.

- IBM Enhanced Japanese Katakana keyboard:

  Pressing the 英数/カナ key in Alpha or Alpha symbol shift mode, causes the keyboard to enter Kana or Kana symbol shift mode, respectively. Pressing the 英数/カナ key in Kana or Kana symbol shift mode, causes the keyboard to enter Alpha or Alpha symbol shift mode, respectively.

In Alpha or Kana shift mode, pressing the upper shift key places the keyboard in Alpha symbol or Kana symbol shift mode.

The shift lock (⇧) key can be used to lock the keyboard in Alpha symbol or Kana symbol shift mode. Pressing the upper shift key (⇧) returns to Alpha or Kana shift mode.

Typewriter Type Keys

104/122/124-key keyboard   IBM Enhanced keyboard

Typewriter keyboard	Enhanced keyboard	Description
Alphabetic A	A	Pressing the alphabetic keys in shift states (⬆, 🔒, or Caps Lock) displays the characters on the front of the keys in uppercase. Pressing the alphabetic keys in non-shift state displays the characters in lowercase. All alphabetic keys are repeat-action keys. If the cursor is not in an input field, pressing these keys causes ✗←✗→ to appear. Press the Reset key to remove this symbol and to unlock the keyboard.
Backspace ←	←Backspace	This repeat-action key moves the cursor one position at a time to the left. When the cursor is at the left most position, use of the backspace key will cause the cursor to wrap the line and reappear one line higher on the right side of the screen.

Typewriter keyboard	Enhanced keyboard	Description
Diacritical Mark		Diacritical-mark keys are available for some keyboards or by the keyboard definition function. The keys allow you to enter accented characters.
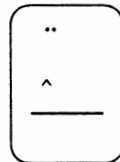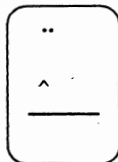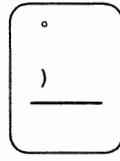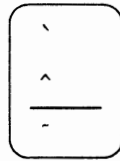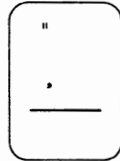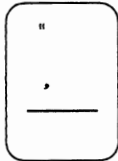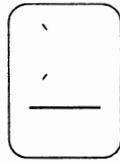
When you press a diacritical-mark key, the accent character appears on the screen but the cursor does not move. Pressing the key that forms the correct accent character combination replaces the existing accent character with the accented character. The Space Bar key forms a correct combination with any diacritical-mark key to produce the accent as a stand-alone character.
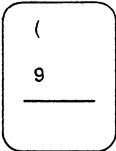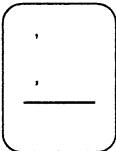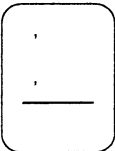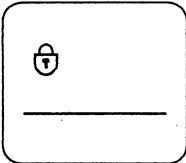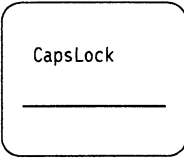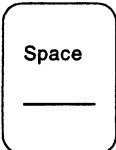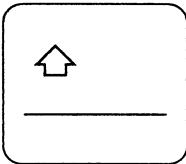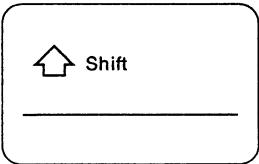
You can use the following keys during the diacritical-mark key and character-key input: Alt, AltCr, CrBnk, Quit, and Shift ($\bigtriangleup$) or Shift Lock ($\bigoplus$). Pressing the Reset key after entering a diacritical-mark key (accent symbol) cancels the diacritical-mark key and character-key input and produces a stand-alone accent at the cursor position. The cursor does not move.

If you try to enter an invalid combination, the accent is displayed as a stand-alone character, and one of the following symbols appears in the operator information area.

- ✗ 王´ +?
- ✗ 王, +?
- ✗ 王` +?
- ✗ 王~ +?
- ✗ 王∧ +?
- ✗ 王° +?
- ✗ 王¨ +?

Note: The accent in the invalid combination appears as a part of the symbol.

Pressing the Reset key removes this symbol and unlocks the keyboard. To correct the error, retype both the accent and the character. When you receive any data from the host computer during your diacritical-mark key and character key input, the keyboard will lock with ✗ ?+ displayed and will exit from the diacritical-mark key mode.

Typewriter keyboard	Enhanced keyboard	Description
Numeric, Symbol, and Punctuation Mark		The numeric, symbol, and punctuation mark keys are repeat-action keys.
(key: `(` `9`)	(key: `(` `9`)	If the cursor is not in an input field, pressing the key causes ✖←♟→ to appear. Press the Reset key to remove this symbol and to unlock the keyboard.
(key: `'` `,`)	(key: `'` `,`)	
Shift Lock (key: lock symbol)	(key: CapsLock)	When you press this key (while holding down the ⬆ key for the CapsLock key): • The keyboard locks in upper shift • The alphabetic characters (A through Z) are entered as uppercase letters • The symbols on the top of the numeric keys and the punctuation marks on the upper half of the other keys are entered. To return the keyboard to lower shift, press the ⬆ key.
Space and Space Bar (key: Space)	(key: Space)	In an input field, pressing the Space Bar or Space key causes a space to be entered at the current cursor position. The cursor moves to the next cursor position. The Space Bar and the Space keys are repeat-action keys. If the cursor is not in an input field, pressing the key causes ✖←♟→ to appear. Pressing the Reset key removes this symbol and unlocks the keyboard.
Upper Shift (key: ⬆)	(key: ⬆ Shift)	When you either press or hold down this key: • The alphabetic characters (A through Z) are entered as uppercase letters • The symbols on the top of the numeric keys and the punctuation marks on the upper half of the other keys are entered. The symbol ⬆ appears in the operator information area when you press the ⬆ key.
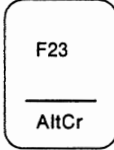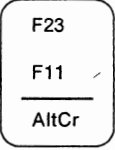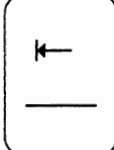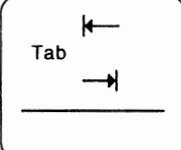
Cursor Control Keys
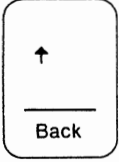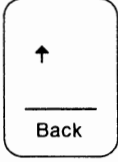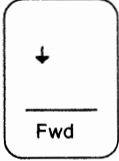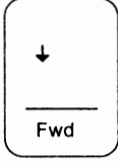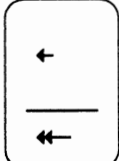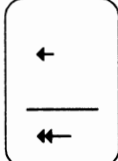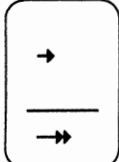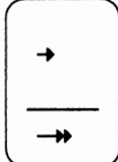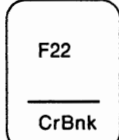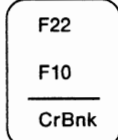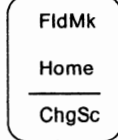
104/122/124-key keyboard

IBM Enhanced keyboard

Typewriter keyboard	Enhanced keyboard	Description
Alternate Cursor F23 AltCr	F23 F11 AltCr	Pressing the Alternate Cursor (AltCr) key while holding the Alt key changes from the shape of the cursor. The cursor changes the underbar cursor _ to the block cursor ■ or vice versa.
Back Tab ◄—	Tab ◄— —►	This key moves the cursor back to the first position of an input field. If the cursor is in an input field, but is not at the first position in that field, press the Back Tab (◄—) key. This will move the cursor back to the first character position in the field. When the cursor is not in an input field, or in the first position of an input field, pressing the Back Tab key moves the cursor to the first position of the previous input field. If the screen is unformatted, or does not contain input fields, pressing the Back Tab key moves the cursor to row 1, column 1 of the screen. The Back Tab key is a repeat-action key.

Typewriter keyboard	Enhanced keyboard	Description
Cursor		Moves the cursor in the direction of the arrow.
↑ Back	↑ Back	The cursor up and down keys are used to move the cursor one position at a time in the direction of the arrow. When either key is held down and the cursor moves off the screen edge, it reappears in the same column, on the opposite side of the screen.
↓ Fwd	↓ Fwd	The cursor left and right keys are used to move the cursor to any position on the screen. When you hold down the cursor right key and the cursor reaches the right edge of the screen, it reappears one line lower on the left side; that is, the cursor wraps. The cursor also wraps when you hold down the cursor left key at the left edge of the screen. It reappears one line higher on the right side of the screen.
← ⇐	← ⇐	The cursor moves diagonally when you press and hold the appropriate two keys at the same time; such as the → and ↑ keys. These keys are repeat-action keys.
→ ⇒	→ ⇒	
Cursor Blink		Pressing the Cursor Blink (CrBnk) key while holding down the Alt key turns on and off the blinking of the cursor.
F22 CrBnk	F22 F10 CrBnk	
Cursor Home		Pressing the Cursor Home (↖) key (while holding down the Alt key for the 104/122/124-key keyboard only) causes the cursor to move to the first input position of the screen.
Rule ↖	FldMk Home ChgSc	The cursor moves to row 1, column 1 of the screen if the screen is unformatted or has no input fields.

Typewriter keyboard	Enhanced keyboard	Description
Graphic cursor F24 +Cr	F24 F12 + Cr	A graphic cursor key is used to specify which one of the two cursors, the alphanumeric or the graphic, is the active cursor. When the graphic cursor mode indicator (+ Cr) appears in the operator information area. the graphic cursor is the current active cursor. Absence of this indicator means that the alphanumeric cursor is currently active. The alternate cursor or cursor blink key is applied to the currently active cursor on the screen. When a mouse or tablet is not attached to the 3472-G, the effect of the cursor move keys is also controlled by this key. This key does not have any effect unless both the alphanumeric and graphic cursors are on the screen.
New Line ◀┘	◀┘ New Line	This key moves the cursor to the first input position in the next line. If there are no input positions, the cursor moves to row 1, column 1 of the screen. If the screen is unformatted, the cursor moves to the first character position of the next line. The New Line key wraps the cursor from the end of the screen to the beginning of the screen. This key is a repeat-action key.
Next/Previous Word ← ◀─ → →▶	← ◀─ → →▶	Pressing the →▶ key while holding down the Alt key moves the cursor to the first position of the next word. Pressing the ◀─ key while holding down the Alt key moves the cursor to the first position of the previous word. These keys are repeat-action keys.
Tab →|	├─ Tab →|	The Tab key is a repeat-action key that allows you to move the cursor from the current position to the first position of the next input field. If there are no input fields after the current cursor position, the cursor moves to the first character position of the first input field in the screen. If the screen is not formatted or does not contain input fields, pressing this key moves the cursor to row 1, column 1 of the screen.
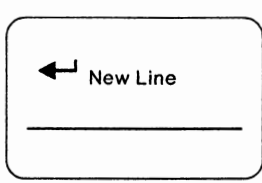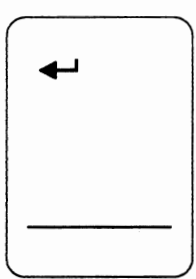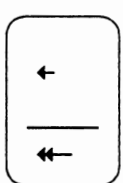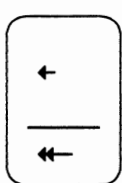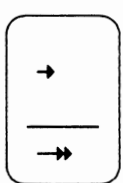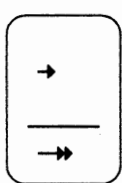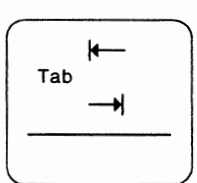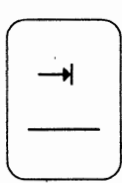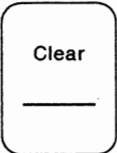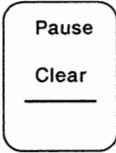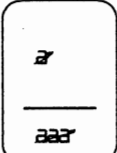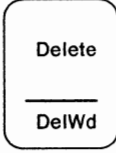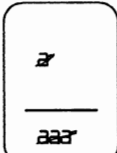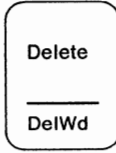
Screen Control Keys
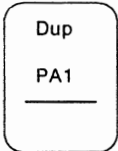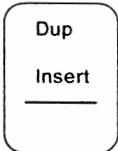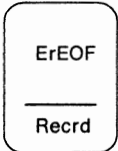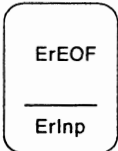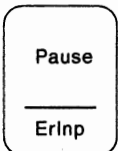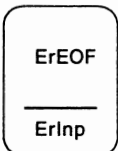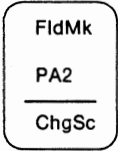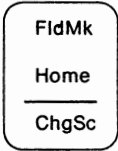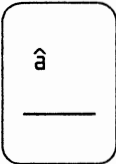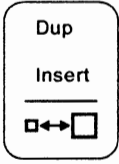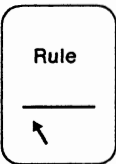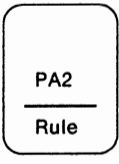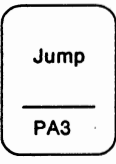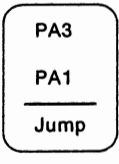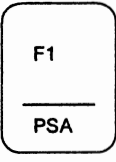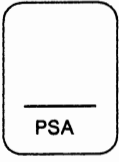
104/122/124-key keyboard   IBM Enhanced keyboard
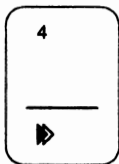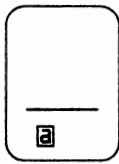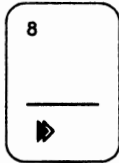
Typewriter keyboard	Enhanced keyboard	Description
Clear	Pause / Clear	This key blanks the current screen except for the cursor, the separator line, and the operator information area.
Delete Character	Delete / DelWd	Pressing the Delete Character key deletes data from an input field. When you press this key, the character at the cursor location is deleted, and all characters to the right of the cursor (in the same input field) shift one position to the left. Null characters are inserted into the right end of the field as the characters in the field are shifted left.
		If you press the Delete Character key when the cursor is not located in an input field, ✗←ƛ→ appears. Press the Reset key to remove the symbol and to unlock the keyboard. The Delete Character key is a repeat-action key.
Delete Word	Delete / DelWd	The Delete Word key, while holding down the Alt key, deletes the word the cursor is positioned under and the following space or null in an input field. If the cursor is in the middle of a word (not a first character), pressing this key deletes the characters from the current cursor position to the end of the word. All the words to the right of the deleted word (on the same line and in the same field) shift to the left.
		When you press the Delete Word key and the cursor is not in an input field, ✗←ƛ→ appears in the operator information area and the keyboard is locked.
		If the cursor is under a blank character, the Delete Word key deletes the blank character. This key is a repeat-action key.

Typewriter keyboard	Enhanced keyboard	Description
Duplicate Dup PA1	Dup Insert	Pressing the Dup key while holding down the ⟨⟩ key places the symbol x̄ on the screen. The cursor moves to the first position of the next input field. Handling of the symbol is dependant on the application program. Pressing this key when the cursor is not in an input field will cause ✗←x̄→ to appear in the operator information area. To remove the symbol and to unlock the keyboard, press the Reset key.
Erase End-of-field ErEOF Recrd	ErEOF ErInp	This key erases all characters from the cursor position to the end of the field while the cursor is in an input field. The cursor does not move. On an unformatted screen, pressing this key erases all characters from the cursor position to the end of the screen. Pressing this key when the cursor is not in an input field will cause ✗←x̄→ to appear in the operator information area. To remove this symbol, and to unlock the keyboard, press the Reset key.
Erase Input Pause ErInp	ErEOF ErInp	Pressing this key while holding down the Alt key erases the contents of all input fields in the screen and moves the cursor to the beginning of the first input field. If the screen has no input field, the cursor moves to row 1, column 1 of the screen; no data is erased. If the screen is unformatted, this key clears the screen and moves the cursor to row 1, column 1 of the screen.
Field Mark FldMk PA2 ChgSc	FldMk Home ChgSc	Pressing this key while holding down the ⟨⟩ key places the symbol ⁻⁷ on the screen. The cursor moves to the next input position. Handling of the symbol is dependant on the application program. Pressing this key when the cursor is not in an input field will cause ✗←x̄→ to appear in the operator information area. To remove this symbol, and to unlock the keyboard, press the Reset key.

Typewriter keyboard	Enhanced keyboard	Description
Insert Mode	Dup Insert ◻↔◻	This key places the keyboard in insert mode. The Insert symbol ∧ appears in the operator information area. Pressing this key allows you to insert a character into an existing input field without writing over existing data. Null characters, displayed as blanks, must be in the right most positions of the field where the insert will be performed.
		When a new character is inserted at the cursor location, characters to the right of the cursor will shift one position to the right.
		If you attempt to insert more characters than there are nulls, ✗ ↗ appears in the operator information area, and the keyboard locks. Pressing the Reset key removes the symbol and unlocks the keyboard. To turn off insert mode, press the Reset key.
		The following keys also turn off insert mode.
		Attn, Clear, Test, Enter, SysRq, PA1 - PA3, F1 - F24, and â (in document mode).
Rule Rule ↖	PA2 Rule	Pressing this key (while pressing and holding down the Alt key for the IBM Enhanced keyboard) turns on and off the rule line on the screen.
		When "No" is selected for "Follows cursor" of "Rule line" in setup panel, the rule line appears at the cursor position and remains at the same position even if the cursor is moved. Pressing the Rule key again moves the rule line to the current cursor position. If the current cursor position is the same as the rule line position, the rule line disappears when the Rule key is pressed.
Jump Jump PA3	PA3 PA1 Jump	Pressing the Jump key changes the session that you communicate with. The session changing sequence is defined in the screen profile. Refer to "Managing Window Characteristics" on page 2-18 for the operation.
Program Symbol Set F1 PSA	PSA	If the application program allows, you can specify the character set that is used for displaying data. Pressing this key changes the character set to the display station original character set from the program symbol set.
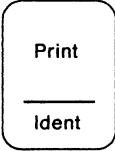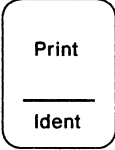
Typewriter keyboard	Enhanced keyboard	Description
Program Symbol Set Field Inherit F3 ▶	4 ▶	If the application program allows, you can load a character set from the host. When a character set is specified, the subsequent characters will be displayed from that set. The character set can be specified either by the user or by the application program.
Background Non-Transparent F5 🄰	🄰	If the application program allows changing the keyboard attribute for screen background, this key causes a transparent background to change to non-transparent. The keyboard attribute for non-transparent background remains in effect until you select a background transparent field inherit, or the application program specifies a transparent background or no longer allows your selection.
Background Transparency Field Inherit F6 ▶	8 ▶	If the application program allows selection of background transparency, this key causes the subsequent data to be displayed with the background transparent when the screen is unformatted. If the screen is formatted, transparency is specified in the extended field attribute of the field where the cursor locates.

Local Function Keys

104/122/124-key keyboard

IBM Enhanced keyboard

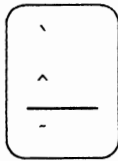| Typewriter keyboard	Enhanced keyboard	Description
Print ┌─────────┐ │ Print │ │ ─────── │ │ Ident │ └─────────┘	┌─────────┐ │ Ident │ │ Print │ │ ─────── │ │ SysRq │ └─────────┘	Pressing the Print key places the display station in print mode or sends the screen data to the printer that is assigned to your display station. The number ▭—▭ **nn** in the operator information area indicates to which printer the screen data is sent. ✗⚡ appears, if any of the following conditions occurs: • No printer status indicator is present • ▭—▭ ?? is present • ▭—▭ nn is present and **nn** identifies a printer that is actually a display station or not defined to accept your print data. Press the **Reset** key to remove this symbol and to unlock the keyboard.
Print ID ┌─────────┐ │ Print │ │ ─────── │ │ Ident │ └─────────┘	┌─────────┐ │ Ident │ │ Print │ │ ─────── │ │ SysRq │ └─────────┘	Pressing this key while holding down the Alt (⟨⟩ for the IBM Enhanced keyboard) key, requests a change to either your printer number (ID) or printer class, or causes the existing printer number to appear. The printer-status indicator displayed in the operator information area tells which action occurred. The printer number is the address that the control unit recognizes as the printer.

Typewriter keyboard	Enhanced keyboard	Description
Quit Reset Quit	Reset/ Ctrl Quit	Pressing this key while holding down the Alt key cancels the printing and unlocks the keyboard when either of **✕** ▭–▭ ⟨ or **✕** ▭–▭ ⟨ appears in the operator information area. **Note:** The Quit key cancels the printing of data that has not been sent to the printer. For this reason, some or all data may be printed even if you press the Quit key. The Quit key may also be used to remove **✕** ▭–⟍ from the operator information area. The Quit key does not affect the printing requested from a host system. In record/play mode, this key is used for cancelling the record/play operation.
SetUp ExSel SetUp	SetUp Attn ExSel	Pressing the SetUp key places the display station in setup mode. You can define various display station characteristics in setup mode. To exit from setup mode, press the SetUp key again. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1 and Chapter 2, "Operations" on page 2-1.
Copy Copy Play Test	F18 F6 Copy	Pressing the Copy key places the display station in copy mode. You can copy a part of the screen contents to another part of the same session or of the other sessions. To exit from copy mode, press the Copy key again. Refer to "Copying Screen Contents" on page 2-27 for the operation.
Help ▭↔▢ Help	Help Test	Pressing the Help key in local mode (such as setup, record/play, copy, and print) opens a Help window on the screen and displays a brief explanation for the operation. To close the Help window, press the Help key again.

Test Keys

104/122/124-key keyboard   IBM Enhanced keyboard

Typewriter keyboard	Enhanced keyboard	Description
Test Copy Play Test	Help Test	For the AEA session, pressing this key while holding down the Alt key places the display station in online test mode. Pressing the Test key while holding down the Alt key again causes the display station to exit from online test mode. Refer to page 3-6 for details. **Warning:** Pressing the Test key may detach the display station from the host application program and cause a loss of data.
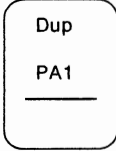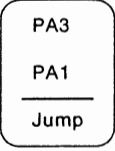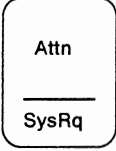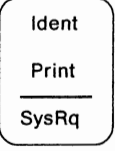
Host Function Keys

104/122/124-key keyboard   IBM Enhanced keyboard

Typewriter keyboard	Enhanced keyboard	Description
Attention		This key is used to interrupt the application program. The Attention key works only when $\underline{\text{B}}$ appears in the operator information area. If you press the Attention (Attn) key when $\underline{\text{B}}$ is not present, ✗ - f appears in the operator information area.
Attn / SysRq	SetUp / Attn / ExSel	
Cursor Select		This key is used in place of a selector light pen. There are two types of detectable fields: (1) selection fields and (2) attention fields. Use the Cursor Select (CrSel) key to select items in selection fields or to notify the program of your choice by selecting an attention field.
CrSel	F21 / F9 / CrSel	If you press the Cursor Select key in a field not defined as selectable, ✗ ←ᚷ→ appears. Press the Reset key to remove this symbol and to unlock the keyboard.
Enter		When ■ or ▦ is present, this key transmits data from the screen to an application program. If neither symbol is present, ✗ - f appears. Press the Reset key to remove this symbol and to unlock the keyboard.
Enter	Enter	This key does not change the keyboard shift status of the display station, but it does cancel insert mode.
Function		The function keys (F1 - F24) provide a means of communicating with the application program. Each Function key sends a particular signal to the application program.
F1 / PSA	F13 / F1	If ■ is not present, pressing a function key causes ✗ - f to appear. Press the Reset key to remove this symbol and to unlock the keyboard.
		When $\underline{\text{B}}$ is displayed in the operator information area, pressing a function key while sending data to the host computer causes ✗ ?+ to appear. Press the Reset key to remove this symbol and to unlock the keyboard.
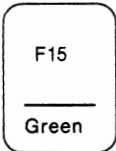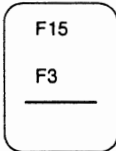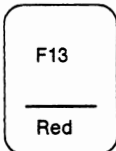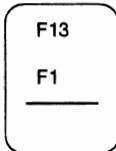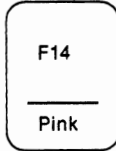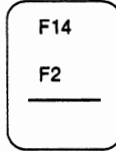
Typewriter keyboard	Enhanced keyboard	Description
Program Access Dup PA1	PA3 PA1 Jump	The program access keys provide a means of communicating with the application program. The application program defines their use. When ᴮ is displayed and ■ is not present in the operator information area, pressing a PA key causes ✖ - f to appear. Press the Reset key to remove this symbol and to unlock the keyboard. Pressing a PA key while sending data to the host computer causes ✖ ?+ to appear. Press the Reset key to remove this symbol and to unlock the keyboard. **Note:** The PA3 key can be used only when the display station is attached to a control unit that supports this key.
System Request Attn SysRq	Ident Print SysRq	When ᴮ is displayed in the operator information area, pressing this key while holding down the Alt key switches ownership of the screen between the application program and the System Services Control Point (SSCP). When ■ or ⑦ appears, pressing the SysRq key while holding down the Alt key: • Erases the screen • Moves the cursor to row 1 and column 1 on the screen • Replaces ■ or ⑦ with Ⓧ. Pressing the SysRq key while holding down the Alt key again replaces Ⓧ with ■ or ⑦. When ᴬ is displayed in the operator information area, pressing this key sends a test request to the host system if the display station is in the implicit-partition state. **Note:** When either ᴬ or ᴮ is displayed and none of the following symbols are present in the operator information area, pressing the SysRq key while holding down the Alt key causes ✖ - f to appear: **System Operator** Ⓧ **My Job** ■ **Unowned** ⑦. Press the Reset key to remove ✖ - f and to unlock the keyboard.
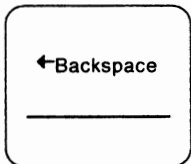
Entry Assist Function Keys

104/122/124-key keyboard   IBM Enhanced keyboard
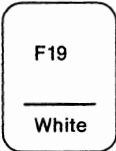
Typewriter keyboard	Enhanced keyboard	Description
Change Format F15 Green	F15 F3	When you press the ExSel key, then press this key while in document mode, the display station enters change-format mode and a scale line appears in the operator information area. In change-format mode, you can change the format control settings, such as screen margins and end-of-line signal. Note that in this mode, no operator messages are displayed in the operator information area. When pressed again, the display station exits from change-format mode.
Document On/Off F13 Red	F13 F1	When you press the ExSel key, then press the Document On/Off key, as indicated on the keyboard overlay, the display station enters into document mode and the DOC symbol appears in the operator information area. The document mode symbol means that the display station is in document mode; the word wrap symbol (⟱) means that the display station turned on the word-wrap function. Pressing this key again causes the display station to exit from document mode. However, the display station retains all other settings (screen margins, the audible end-of-line signal, tab sets, home position and word-wrap mode). Entering document mode restores the settings.
Word Wrap On/Off F14 Pink	F14 F2	When you press the ExSel key, then press this key while the display station is in document mode, the word wrap symbol (⟱) disappears from the operator information area and word-wrap is turned off. Pressing this key again, turns on word-wrap. Word-wrap moves the last word on a row to the next row, when the word would otherwise overrun the right margin. If you press this key while the display station is not in document mode, the keyboard locks and ✖ - f appears in the operator information area.

Typewriter keyboard	Enhanced keyboard	Description
Error-correcting Back-space ←	←Backspace	This key is defined as the Error-correcting Backspace key when the display station is in document mode and the word-wrap is turned on. Using this key moves the cursor one position at a time to the left and a character on the cursor position is deleted.

Response Time Monitor Key

104/122/124-key keyboard   IBM Enhanced keyboard

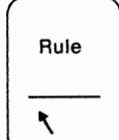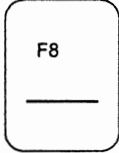| Typewriter keyboard	Enhanced keyboard	Description
Response time monitor		If the control unit enables the response time monitor function, using this key in extended select mode (with the **ExSel** key) allows you to check the response time of the host computer. The time appears in columns 19 through 26 in the operator information area.

Typewriter keyboard:
```
F19
―――
White
```

Enhanced keyboard:
```
F23
F11
―――
AltCr
```

To check the response time of your host system, press the **ExSel** key, and then press the **RTM** key. One of the following symbols appears:

✗ ? +	The control unit does not allow the display station to display the response time
⟨ :	The display station is not allowed to display the response time
⟨ :ss.t	ss for seconds and t for tenths of seconds
⟨ mm:ss	mm for minutes and ss for seconds
⟨ :??.?	response time monitoring is cancelled.

To cancel the response time monitor, press the **ExSel** key, and then press the **RTM** key again.

For additional information about the response-time-monitor function, refer to the *IBM 3174 Subsystem Control Unit Help Desk Reference* or the *IBM 3274 Control Unit Description and Programmer's Guide*.

APL On/Off Key
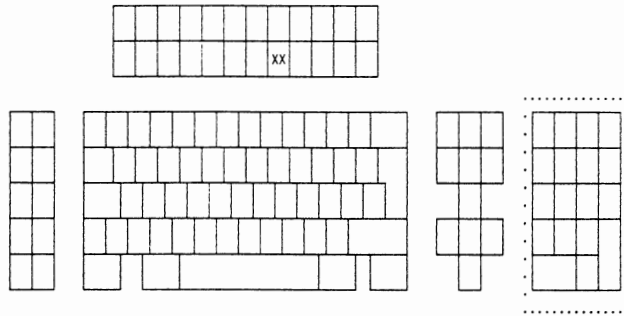
Typewriter keyboard	Enhanced keyboard	Description
APL On/Off F8		Pressing this key after you pressed the ExSel key, turns on or off the APL mode of the display station. The control unit has to be correctly customized for APL for this operation.

Chapter 5. Problem Solving

This section helps you resolve problems you may encounter during display station operation.

Requests for service should be directed to the IBM service center by dialing the appropriate number. Refer to "Request for Service" on page 5-40 for details.

Problem Solving Initial Checks

This section guides you in isolating the failing part of your display station as well as identifying operational errors.

1. Is the alarm sounding continuously?

   Yes, go to "Alarm sounds continuously" on page 5-7.
   No, go to step 2.

2. Does any operator message appear in the operator information area?

   ```
   |                                              |
    ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾
        Operator Information Area
   ```
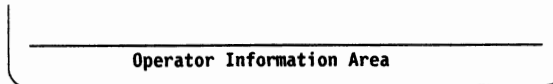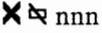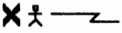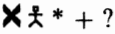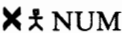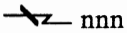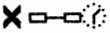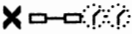
   Yes, go to "Operator Messages" on page 5-2, then find your symbol from the chart, and perform the appropriate action.

   No, go to "Problem Symptom" on page 5-5, then find your symptom from the chart, and perform the appropriate action.

Operator Messages

Note: For additional details of the following symbols, see Chapter 3, "Operator Messages" on page 3-1.

Symbol	Action
✗ ⑦	You need to wait for the function to complete. If you wait for more than several minutes, contact your system coordinator.
✗ SYSTEM	Wait or press the Reset key.
✗ nnn ✗ ↘ nnn ✗ ⟶z⟶nnn ✗ PROG nnn ✗ ⟶⟶⟶ ✗ ⟶ * + ? ✗ ⟶ # ? ✗ ⟶ ✗	Press the Reset key and retry the operation. If the symptom still appears, contact your system coordinator. (n: 0-9) Refer to "Error Code Charts" on page B-22 for details of the error code "nnn".
✗?+ ✗ -f	Press the Reset key and retry the operation.
✗ ←⟶→	Press the Reset key and move the cursor to the appropriate field for the correct operation.
✗ ⟶ >	Press the Reset key. Correct the entry.
✗ ⟶ NUM	Press the Reset key and enter a number.
✗ - S	Press the Reset key to restore the keyboard.
⟶z⟶ nnn ✗ ⊡⟶↘ ✗ ⊡⟶⊡⑦ ✗ ⊡⟶⊡⑦⑦	Contact your system coordinator. (n: 0-9) Refer to "Error Code Charts" on page B-22 for details of the error code "nnn".
2%%	The keyboard layout ID in the setup panel may not match the one defined during the control unit customization. Contact your system coordinator.
⊡⟶▪	Go to "Printer Problem" on page 5-28.

Continued on the next page
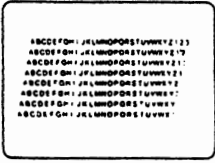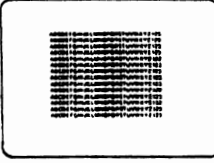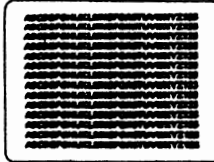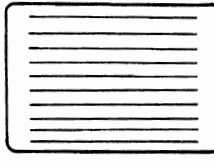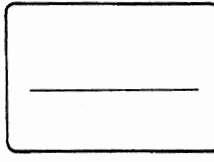
Symbol	Action
✗ ⌐	1. Turn the security key counterclockwise.

2. Turn the security key clockwise.
3. Does "✗ ⌐" still appear?
   Yes, go to step 4.
   No, continue the operation.
4. Set the power switch to Off; wait a few seconds.
5. Set the power switch to On.
6. Does "✗ ⌐" still appear?
   Yes, the security keylock of the logic element is failing. Go to "Request for Service" on page 5-40.
   No, continue the operation.

LK

1. Set the power switch to Off; wait a few seconds.
2. Set the power switch to On.
3. Does "LK" still appear?
   Yes, go to step 4.
   No, continue the operation.
4. Set the power switch to Off.
5. Disconnect the keyboard cable from the logic element.

6. Set the power switch to On.
7. Does "LK" still appear?
   Yes, the logic element is failing. Go to "Request for Service" on page 5-40.
   No, the keyboard is failing.
   Go to "Request for Service" on page 5-40.

Continued on the next page

Symbol	Action

K	1. Do you see a number at the next column of "K"?
	    Yes, press the ◻↔□ key. Does the problem continue?
	        Yes, go to "Problem Symptom" on page 5-5.
	        No, resume operation. The session was windowed and the entire screen was not displayed.
	    No, go to step 2.
	2. Set the power switch to Off.
	3. Make sure the keyboard cable is tightly connected.
	
	4. Set the power switch to On.
	5. Wait ten seconds.
	6. Does "K" still appear?
	    Yes, the keyboard is failing.
	        Go to "Request for Service" on page 5-40.
	    No, continue the operation.

L	Do you see a number at the next column of "L"?
	
	Yes, press the ◻↔□ key. Does the problem continue?
	    Yes, go to "Problem Symptom" on page 5-5.
	    No, resume operation. The session was windowed and the entire screen was not displayed.
	No, the logic element is failing. Go to "Request for Service" on page 5-40.

▣
S
N
 	
(at column 1)
	1. Press the ◻↔□ key. Does the problem continue?
	    Yes, go to step 2.
	    No, resume operation. The session was windowed and the entire screen was not displayed.
	2. Do you see another symbol at the next column of this symbol?
	    Yes, these indicators mean that the control unit or the host system is in ready state. Go to "Problem Symptom" on page 5-5.
	    No, contact your system coordinator.

an (a: an alphabet, n: 0-9)	Press the ◻↔□ key. Does the problem continue? **Yes,** go to "Problem Symptom" on page 5-5. **No,** resume operation. The session was windowed and the entire screen was not displayed.

Problem Symptom

Find your symptom from the following symptoms and perform the appropriate action.

Problem Category	Symptom	Page
Alarm	Alarm sounds continuously	5-7
	Alarm does not sound	5-7
Display	Screen is completely blank	5-9
	Only a horizontal line and a cursor are displayed	5-12
	IBM logo is displayed	5-12
	An unexpected cursor appears on the screen	5-12
	Screen Problem	5-13

Distorted   Shrunk   Tilted

Expanded   Out of Focus

Screen is too dark		5-13
Brightness knob does not work		5-13
Screen is wavy		5-14
The color is not correct		5-15
Characters or symbols on the screen have extra or missing dots		5-19
Characters or symbols on the screen are moving vertically or horizontally		5-19

Problem Category	Symptom	Page
	Host graphics application program does not work correctly	5-19
	"Offline Setup" panel is displayed every time the power switch is set to On	5-19

```
                        Offline Setup

 Move cursor to desired selection and press ENTER.
```

Problem Category	Symptom	Page
Keyboard	Characters are typed, but are not displayed on the screen	5-21
	Keyboard clicker does not sound	5-21
	A single character is typed, but multiple characters are displayed on the screen	5-22
	An unexpected character (a character different from what should appear) is displayed on the screen	5-22
	Typematic keys do not work	5-22
	Characters are displayed on the screen without typing	5-23
Power-on Light	The power-on light does not stay on	5-24
Printer	Printer does not work	5-28
Mouse	Mouse does not work	5-30
Plotter or Tablet	Plotter or tablet does not work	5-32
Mechanical	The security key does not work	5-34
	The cover is damaged	5-34
	The stand or the lift-stand is damaged	5-34

Alarm Problems

┌─ **Symptom** ──┐
│   │
│ Alarm sounds continuously.   │
│   │
└──┘

1. Does the power-on light stay on?
   Yes, go to step 2.
   No, go to "Power-on Light Problem" on page 5-24.
2. Set the power switch to Off; wait a few seconds.
3. Set the power switch to On.
4. Does the alarm still sound continuously?
   Yes, go to step 5.
   No, continue the operation.
5. Does the alarm sound repeatedly?
   Yes, your display element may not be the correct one for this display station.
     Install a correct display element.
   No, the logic element is failing. Go to "Request for Service" on page 5-40.

┌─ **Symptom** ──┐
│   │
│ Alarm does not sound.   │
│   │
└──┘

1. While holding down the Alt key (Shift key for the IBM Enhanced Keyboard),
   press the Setup key.
2. Is the screen completely blank?
   Yes, go to "Screen is completely blank" on page 5-9.
   No, go to step 3.
3. Does the "Online Setup" panel appear?

┌──┐
│   Online Setup   │
│──│
│ Move cursor to desired selection and press ENTER.   │
│   │
└──┘

   Yes, go to step 4.
   No, the keyboard is failing. Go to "Request for Service" on page 5-40.
4. Press the Enter key to select "Setup display".
5. The "Display Setup" panel should appear.

┌──┐
│   Display Setup   More: +   │
│──│
│ Move cursor to desired field. Type the requested information or   │
│ press SPACE BAR to select choice.   │
│   │
└──┘

6. Press the F8 key twice to skip two screens.

7. Move the cursor to select "High" in the Alarm Volume field and press the Space Bar.

```
/                                                                    \
|                        Display Setup                     More: -   |
|  _____  |
|  Move cursor to desired choice, then press SPACE BAR to select.    |
|                                                                    |
|    Typematic                                                       |
|      Rate . . . . . . . . . .  [Normal]      Fast                  |
|                                                                    |
|      Delay  . . . . . . . . .   Short       Normal      Long       |
|                                                                    |
|    Clicker                                                         |
|      Click  . . . . . . . . .   Yes          No                    |
|                                                                    |
|      Volume . . . . . . . . .   Off          1          2          |
|                                 3            4          High       |
|                                                                    |
|      Alarm volume . . . . . . . Off          1          2          |
|                                 3            4          High       |
|                                                                    |
|                                                                    |
|                                                                    |
|                                                                    |
|    F3=Exit     F7=Backward                                          |
|  _____  |
|  SETUP                                                             |
\                                                                    /
```

8. The display attribute "High" should change to yellow.
9. Move the cursor to "1" in the Alarm Volume field and press the Space Bar. Listen to the sound level.
10. Move the cursor to "4" in the Alarm Volume field and press the Space Bar. Listen to the sound level.
11. Does the alarm sound change?

    Yes, go to step 12.

    No, the logic element is failing. Go to "Request for Service" on page 5-40.
12. Move the cursor to select a comfortable sound level and press the Space Bar.
13. While holding down the Alt key (Shift key for the IBM Enhanced Keyboard), press the Setup key; then continue the operation.

Display Problems

┌─ **Symptom** ──┐

Screen is completely blank.

└──┘

1. Set the power switch to Off.
2. Make sure the power cord is tightly connected at both ends (electrical outlet and display element).
3. Wait approximately one minute.
4. Set the power switch to On.
5. Does the power-on light stay on?
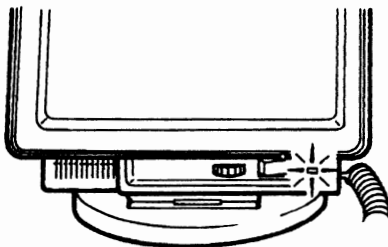
   Yes, go to step 6.
   No, go to "Power-on Light Problem" on page 5-24.
6. Turn the brightness knob all the way to the right.
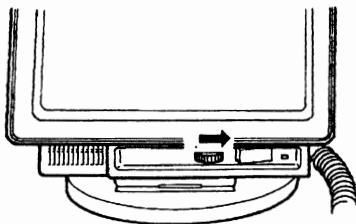
7. Turn the security key clockwise and wait ten seconds.

8. Does the problem still exist?
   Yes, go to step 9.
   No, continue the operation.
9. Set the power switch to Off.
10. Unplug the power cord from the electrical outlet and display element.

    DANGER

    ┌──┐
    │ **Do not touch the communication cable during an electrical storm. Com-** │
    │ **munication cables can conduct lethal charges of electricity.** │
    └──┘

11. Unplug the power cord and disconnect all of the cables from the display station.

12. Turn the display station upside down so that the screen faces you.
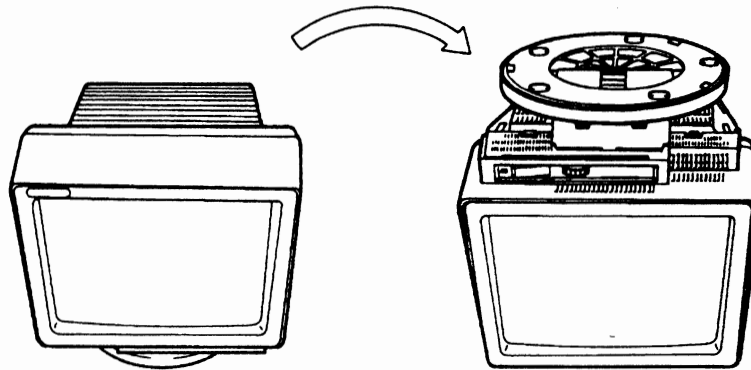
13. If the lift-stand is attached to your display element, go to step 15.
14. Pinch the blue latch and pull up the edge of the stand to remove the stand from the display element.
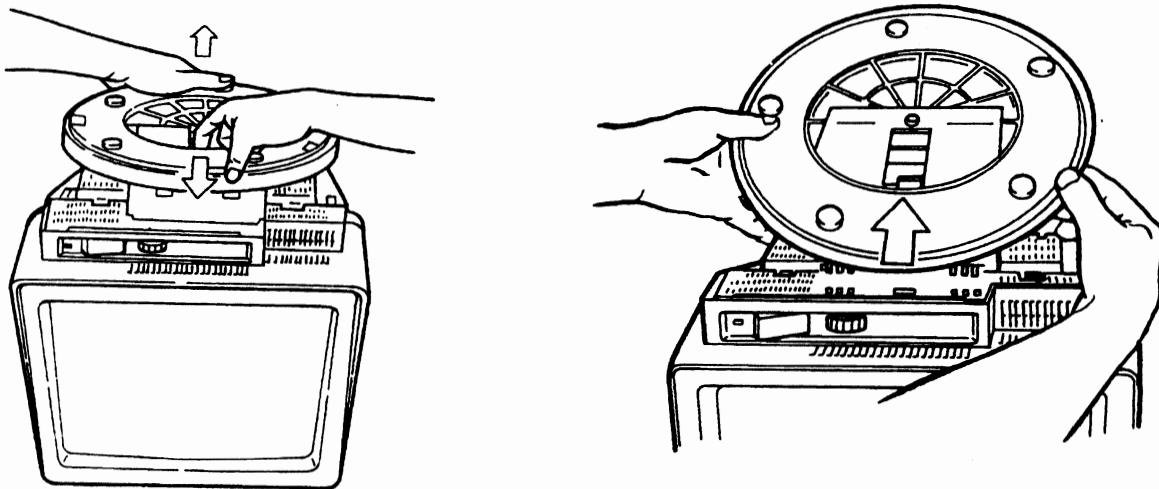
15. Pinch the latch of the logic element and push the logic element to unlock it from the display element.
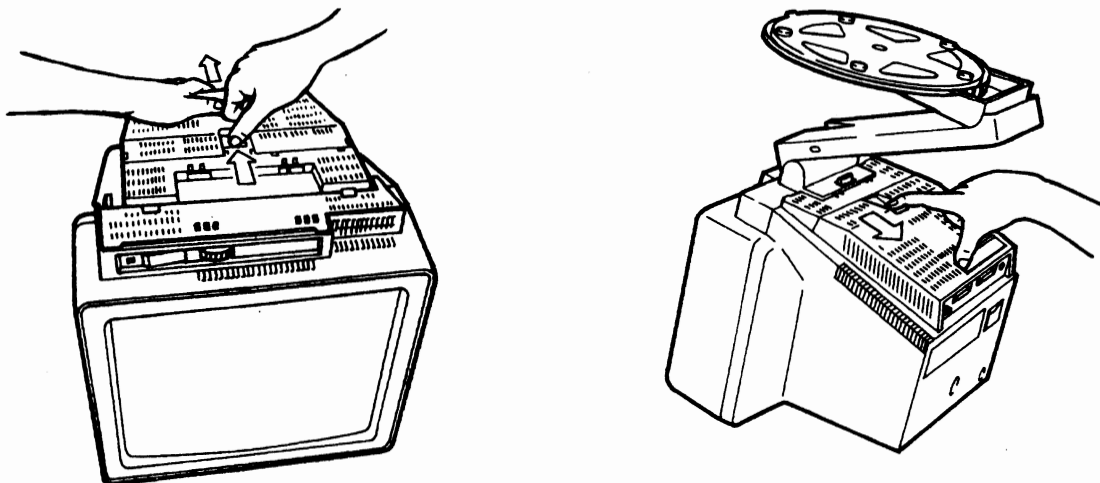
16. Pull up the edge of the logic element to remove the logic element from the display element.
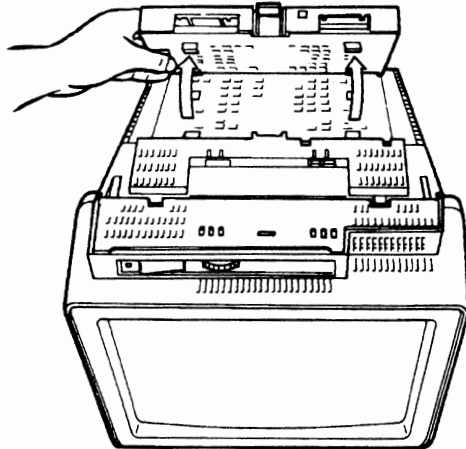
17. Remove the logic element from the display element.
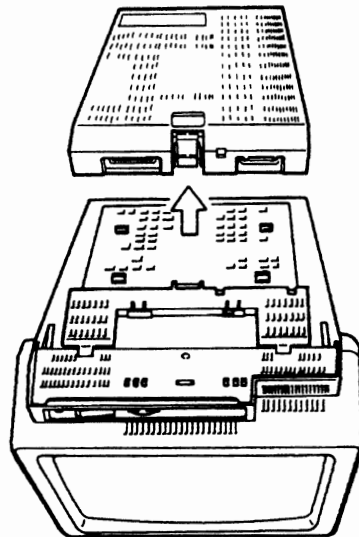
18. Turn the display element right side up.
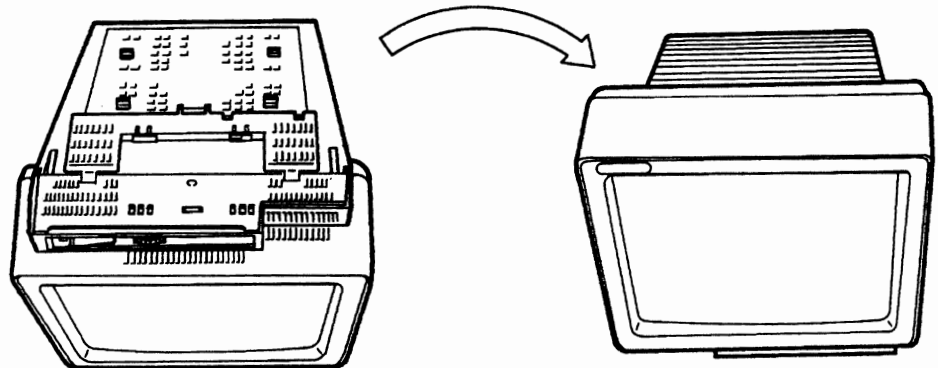
19. Plug the power cord into the display element and electrical outlet.
20. Set the power switch to On.
21. Is the screen completely blank?

    Yes, the display element is failing. Go to "Request for Service" on page 5-40.

    No, the logic element is failing. Go to "Request for Service" on page 5-40.

• Only a horizontal line and a cursor are displayed.
• IBM logo is displayed.

1. Press the Space Bar.
2. Do any characters appear?
   Yes, continue the operation.
   No, go to step 3.
3. Set the power switch to Off.
4. Unplug the power cord from the electrical outlet and display element.

DANGER

> **Do not touch the communication cable during an electrical storm. Communication cables can conduct lethal charges of electricity.**

5. Make sure the communication cable is tightly connected.
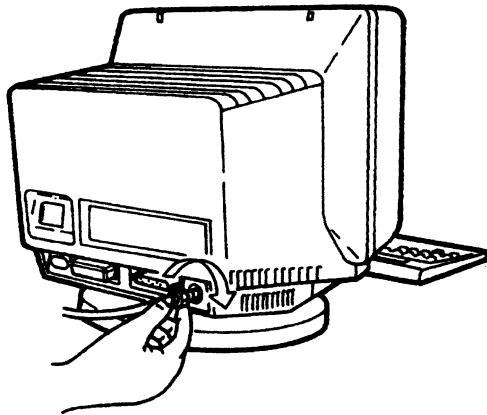
6. Plug the power cord into the display element and electrical outlet.
7. Set the power switch to On and wait ten seconds.
8. Does the problem still exist?
   Yes, go to "Logic Element Check Procedure" on page 5-38.
   No, continue the operation.

Symptom

• An unexpected cursor appears on the screen.

1. While holding down the Alt key (Shift key for the IBM Enhanced Keyboard), press the Setup key.
2. The "Online Setup" panel should appear.
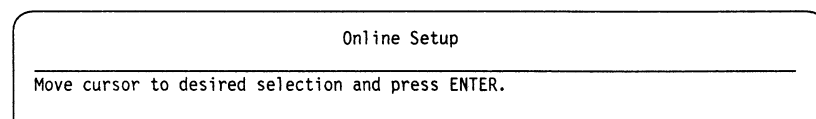
```
                          Online Setup
       ─────────────────────────────────────────────────
       Move cursor to desired selection and press ENTER.
```

3. Press the Enter key to select "Setup display".
4. The "Display Setup" panel should appear.

```
┌─────────────────────────────────────────────────────────────────┐
│                          Display Setup                 More:  +   │
│  ─────────────────────────────────────────────────────────────   │
│  Move cursor to desired field.  Type the requested information or │
│  press SPACE BAR to select choice.                                │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```
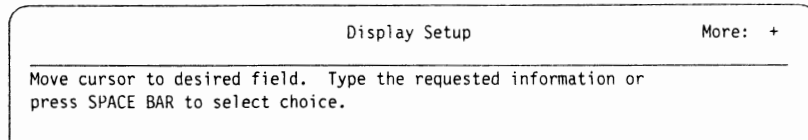
5. Press the F8 key to go to the next screen.
6. Move the cursor to select your desired cursor style and press the Space Bar.

```
┌─────────────────────────────────────────────────────────────────┐
│                          Display Setup                 More:  -+  │
│  ─────────────────────────────────────────────────────────────   │
│  Move cursor to desired choice. then press SPACE BAR to select.   │
│                                                                   │
│    Rule line                                                      │
│       Style . . . . . . . . . .  Horizontal   Vertical    Cross   │
│       Color . . . . . . . . . .  White        Green               │
│       Follows cursor . . . . . . Yes          No                  │
│                                                                   │
│    Alphanumeric cursor                                            │
│       Style . . . . . . . . . .  Underline    Block               │
│       Blink . . . . . . . . . .  Yes          No                  │
│                                                                   │
│    Graphic cursor                                                 │
│       Style . . . . . . . . . .  Cross        Cross-hair          │
│       Blink . . . . . . . . . .  Yes          No                  │
│       Color . . . . . . . . . .  White        Green               │
│                                                                   │
│    Row/column indicator . . . .  On           Off                 │
│                                                                   │
│                                                                   │
│   F3=Exit      F7=Backward    F8=Forward                          │
│  ─────────────────────────────────────────────────────────────   │
│   SETUP                                                           │
└─────────────────────────────────────────────────────────────────┘
```
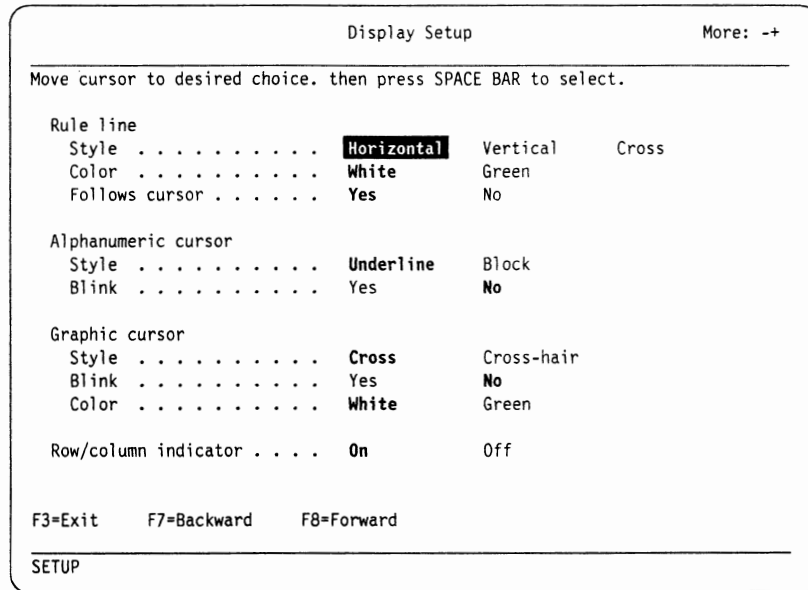
7. Press the F3 key twice.
8. Does the problem still exist?
   Yes, the logic element is failing. Go to "Request for Service" on page 5-40.
   No, continue the operation.

┌─ **Symptom** ───┐
│   │
│ • Screen Problem (distorted, shrunk, tilted, expanded, out of focus, or too │
│   dark.   │
│ • Brightness control knob does not work.   │
│   │
└──┘

1. Does the alarm sound?
   Yes, go to step 2.
   No, go to step 4 on page 5-14.
2. Does the short alarm sound repeatedly?
   Yes, go to step 3.
   No, the logic element is failing. Go to "Request for Service" on page 5-40.
3. Your display element may not be the correct one for the display station. Install
   a correct display element. Does the problem still exist with the correct display
   element?
   Yes, go to step 4 on page 5-14.
   No, the logic element is failing. Go to "Request for Service" on page 5-40.

4. Turn the brightness control knob to a comfortable viewing level.
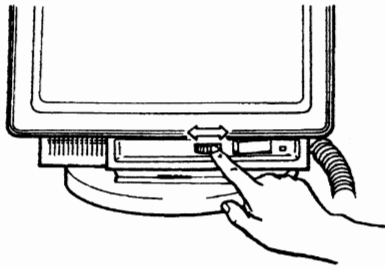
5. Does the problem still exist?
   Yes, the display element is failing. Go to "Request for Service" on page 5-40.
   No, continue the operation.

┌─ **Symptom** ──┐
│   │
│ Screen is wavy.   │
│   │
└──┘

1. Are there other display stations, motors, or fluorescent lamps that are turned on near your display station?
   Yes, go to step 2.
   No, go to step 4.
2. Relocate the electrical appliances (other display stations, motors, or fluorescent lamps) or turn off the power switches of the electrical appliances.
3. Does the problem still exist?
   Yes, go to step 4.
   No, move your display station or the appliances away from each other. Continue the operation.
4. Set the power switch to Off.
5. Press and hold down the Space Bar; then set the power switch to On.

6. Hold the Space Bar down and wait approximately ten seconds.
7. Does the "Offline Setup" panel appear?

┌──┐
│   Offline Setup   │
│ ── │
│ Move cursor to desired selection and press ENTER.   │
│   │
└──┘
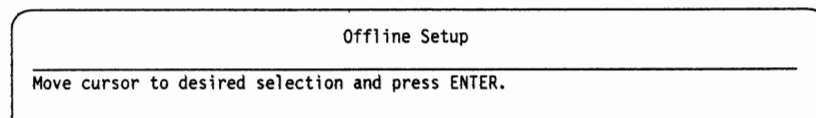
   Yes, go to step 8.
   No, the keyboard is failing. Go to "Request for Service" on page 5-40.
8. Move the cursor to select "Test display station" and press the Enter key.

9. The Offline Test Entry Panel appears on the screen as follows.

```
   3472                           0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ

   AA0012345

   0151  09F4600  09F4602   AAAAAAAA   AAAAAAAA   AAAAAAAA

         09F4601  09F4603   AAAAAAAA   AAAAAAAA   AAAAAAAA

   10111111 10111111        AAAAAAAA   AAAAAAAA   AAAAAAAA

                            ██████     ██████     ██████




Reset=Exit
─────────────────────────────────────────────────────────
 TEST
```
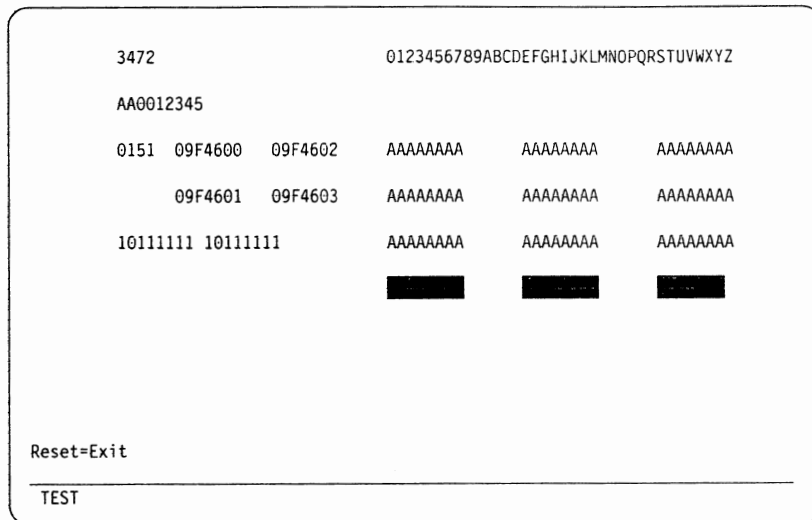
10. While holding down the Alt key, press the F4 key. Make sure the "T 4" with
    A or **B** appears in the operator information area.

```
─────────────────────────────────────────
 T 4              █A
```
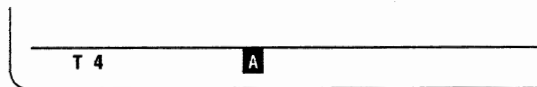
11. Does **A** appear?
    Yes, go to step 12.
    No, go to step 14.
12. Press the F4 key and make sure **A** is replaced by **B**.
13. Go to step 15.
14. Press the F4 key and make sure **B** is replaced by **A**.
15. Does the problem still exist on the screen?
    Yes, the display element is failing. Go to "Request for Service" on page 5-40.
    No, Press the Reset key twice and continue the operation.

Symptom

The color is not correct.

---

1. Set the power switch to Off.
2. Press and hold down the Space Bar; then set the power switch to On.

3. Hold the Space Bar down and wait approximately ten seconds. The "Offline Setup" panel should appear.

```
┌─────────────────────────────────────────────────────────────────┐
│                          Offline Setup                          │
│─────────────────────────────────────────────────────────────────│
│ Move cursor to desired selection and press ENTER.               │
│                                                                 │
└─────────────────────────────────────────────────────────────────┘
```
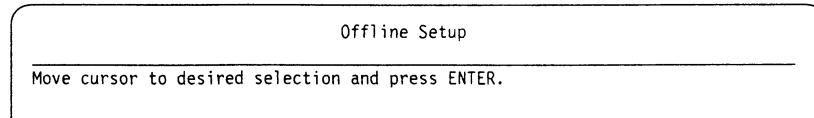
4. Move the cursor to select "Test display station" and press the Enter key.
5. The Offline Test Entry panel appears on the screen.

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                 │
│       3472                    0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ│
│                                                                 │
│       AA0012345                                                 │
│                                                                 │
│       0151  09F4600   09F4602    AAAAAAAA   AAAAAAAA   AAAAAAAA  │
│                                                                 │
│             09F4601   09F4603    AAAAAAAA   AAAAAAAA   AAAAAAAA  │
│                                                                 │
│       10111111 10111111          AAAAAAAA   AAAAAAAA   AAAAAAAA  │
│                                                                 │
│       _                           ████        ████       ████   │
│                                                                 │
│                                                                 │
│                                                                 │
│  Reset=Exit                                                     │
│─────────────────────────────────────────────────────────────────│
│  TEST                                                           │
└─────────────────────────────────────────────────────────────────┘
```
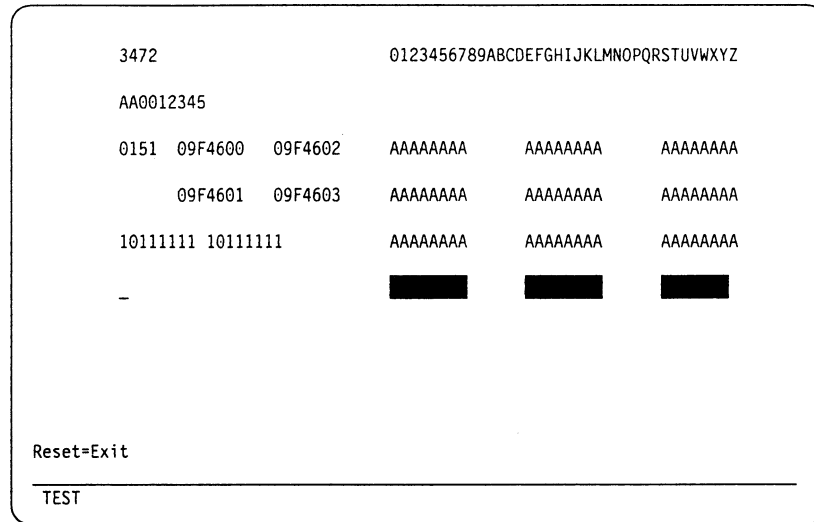
6. Turn the brightness control knob to a comfortable viewing level.
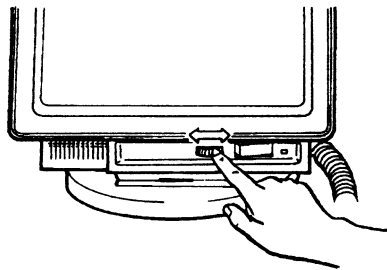
7. Observe the attribute test pattern.

```
        AAAAAAAA      AAAAAAAA      AAAAAAAA

        AAAAAAAA      AAAAAAAA      AAAAAAAA

        AAAAAAAA      AAAAAAAA      AAAAAAAA
```

8. Is the attribute test pattern displayed correctly?

```
   AAAAAAAA            AAAAAAAA           AAAAAAAA
   (blue+normal)       (red+blink)        (pink+reverse)

   AAAAAAAA            AAAAAAAA           AAAAAAAA
   (green+underscore)  (turquoise+normal) (yellow+normal)

   AAAAAAAA            AAAAAAAA           AAAAAAAA
   (white+normal)      (white+normal)     (white+normal)
```

Yes, your display station does not have a problem. Contact your system coordinator.

No, go to step 9 on page 5-17.

9. Set the power switch to Off; wait approximately 15 minutes.
10. Repeat step 2 on page 5-15 through 7 on page 5-16; then go to step 11.
11. Is the attribute test pattern displayed correctly?

   Yes, continue the operation.

   No, go to step 12.
12. Set the power switch to Off.
13. Unplug the power cord from the electrical outlet.

   DANGER

   > **Do not touch the communication cable during an electrical storm. Communication cables can conduct lethal charges of electricity.**

14. Unplug the power cord and disconnect all of the cables from the display station.
15. Turn the display station upside down so that the screen faces you.
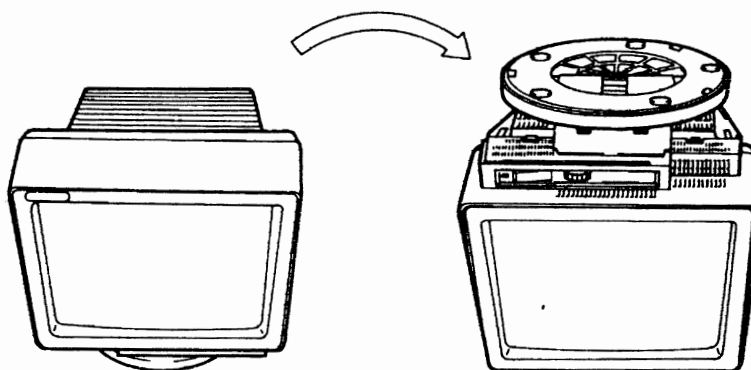
16. If the lift-stand is attached to your display element, go to step 18 on page 5-18.
17. Pinch the blue latch and pull up the edge of the stand to remove the stand from the display element.
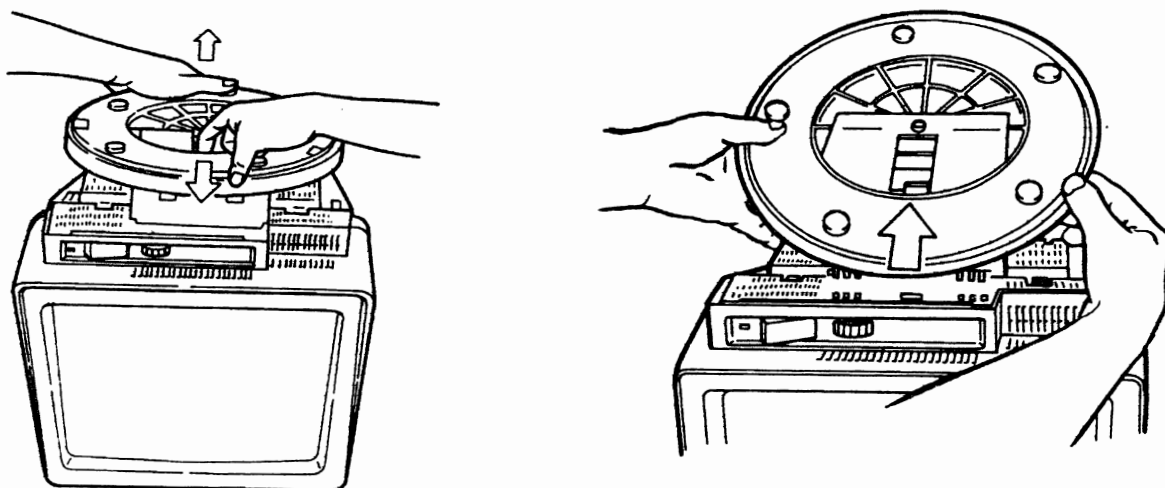
18. Pinch the latch of the logic element and push the logic element to unlock it from the display element.
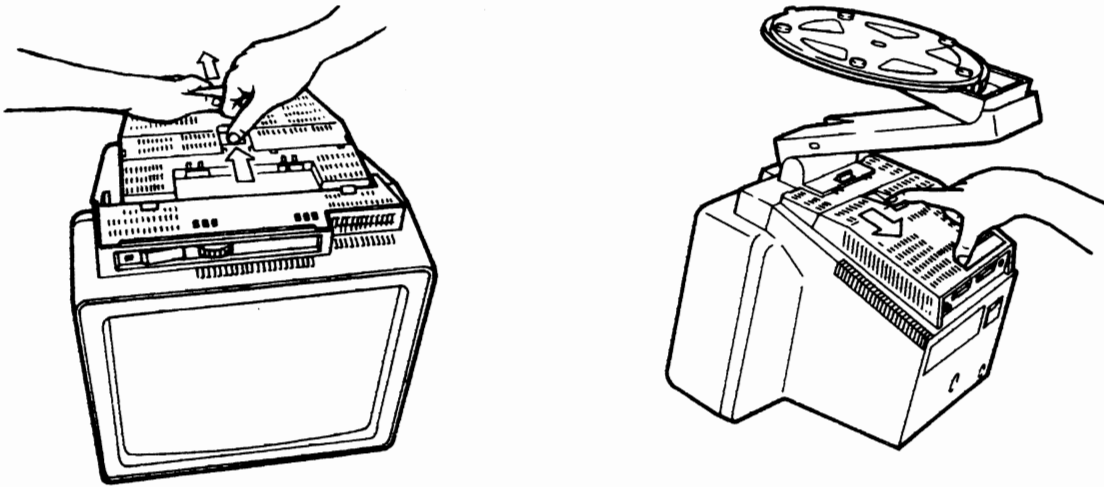
19. Pull up the edge of the logic element to remove the logic element from the display element.
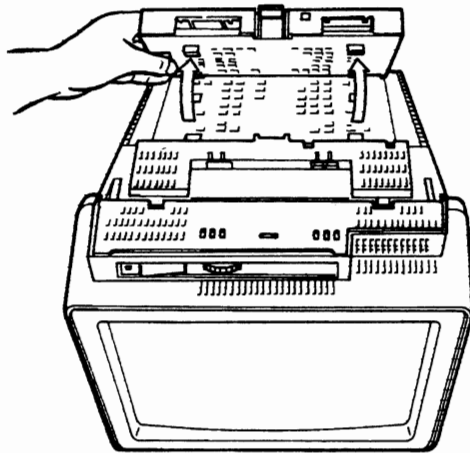
20. Remove the logic element from the display element.
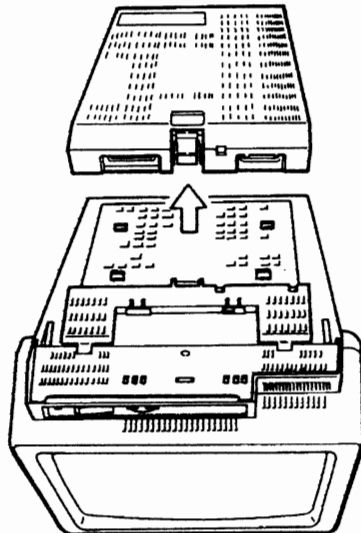
21. Turn the display element right side up.
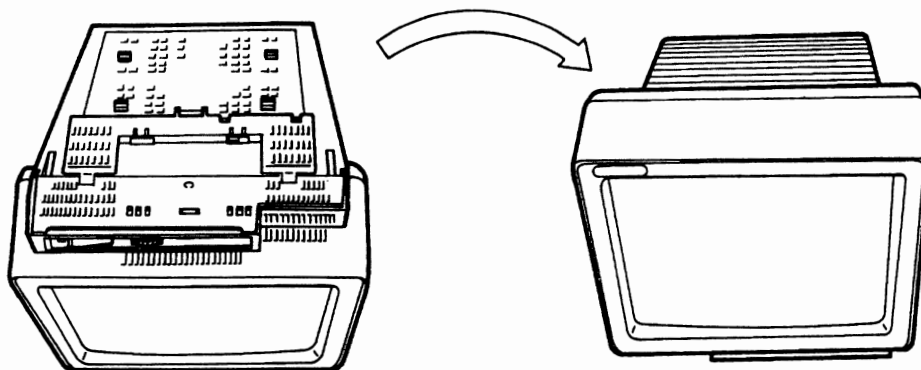
22. Plug the power cord into the display element and electrical outlet.
23. Set the power switch to On.
24. Is the screen white?
    Yes, the logic element is failing. Go to "Request for Service" on page 5-40.
    No, the display element is failing. Go to "Request for Service" on page 5-40.

```
┌─ Symptom ──────────────────────────────────────────────────────────────┐
│                                                                          │
│ Characters or symbols on the screen have extra or missing dots.          │
│                                                                          │
└──────────────────────────────────────────────────────────────────────┘
```

The logic element is failing. Go to "Request for Service" on page 5-40.

```
┌─ Symptom ──────────────────────────────────────────────────────────────┐
│                                                                          │
│ "Offline Setup" panel is displayed every time the power switch is set to On. │
│                                                                          │
└──────────────────────────────────────────────────────────────────────┘
```

1. Set the power switch to Off; wait a few seconds.
2. Make sure there is nothing laying on the keyboard.
3. Set the power switch to On.
4. Does the "Offline Setup" panel still appear?
   Yes, go to "Keyboard Test" on page 5-35.
   No, continue the operation.

```
┌─ Symptom ──────────────────────────────────────────────────────────────┐
│                                                                          │
│ Characters or symbols on the screen are moving vertically or horizontally. │
│                                                                          │
└──────────────────────────────────────────────────────────────────────┘
```

1. Set the power switch to Off; wait a few seconds.
2. Set the power switch to On.
3. Does the alarm sound continuously?
   Yes, the logic element is failing. Go to "Request for Service" on page 5-40.
   No, the display element is failing. Go to "Request for Service" on page 5-40.

```
┌─ Symptom ──────────────────────────────────────────────────────────────┐
│                                                                          │
│ Host graphics application program does not work correctly.               │
│                                                                          │
└──────────────────────────────────────────────────────────────────────┘
```

1. Do you see a return code of the host application program?

Yes, check the host application program. Contact your system coordinator.

No, go to step 2.

2. Press the □↔□ key and retry the operation. Does the problem still appear?

   Yes, go to step 3.

   No, resume operation. Refer to "Graphics Session" on page 2-7.

3. Refer to "Graphics Session" on page 2-7, and check your display station and host system environment. Is the environment correct?

   Yes, the logic element is failing. Go to "Request for Service" on page 5-40.

   No, correct the environment and resume operation.

Keyboard Problems

1. Does the power-on light stay on?
   Yes, go to step 2.
   No, go to "Power-on Light Problem" on page 5-24.
2. Set the power switch to Off.
3. Unplug the power cord from the electrical outlet and display station.

   DANGER

   ┌──┐
   │ **Do not touch the communication cable during an electrical storm. Com-** │
   │ **munication cables can conduct lethal charges of electricity.** │
   └──┘

4. Make sure the communication cable is tightly connected.
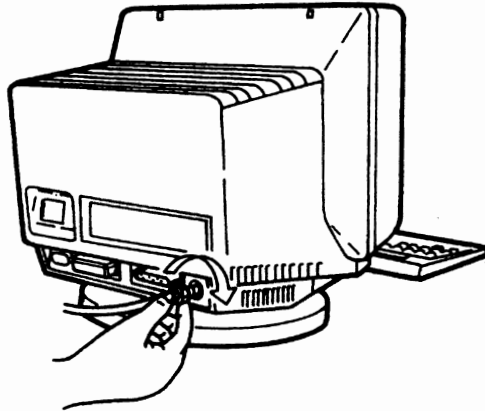
5. Plug the power cord into the display station and electrical outlet.
6. Set the power switch to On.
7. Does the system indicator (such as ▣, N, or S) appear in the operator informa-
   tion area?
   Yes, go to step 8.
   No, go to "Logic Element Check Procedure" on page 5-38.
8. Does the problem still appear?
   Yes, go to "Keyboard Test" on page 5-35.
   No, continue the operation.

┌── Symptom ───┐

Keyboard clicker does not sound.

└──┘

1. While holding down the Alt key (Shift key for the IBM Enhanced Keyboard),
   press the Setup key.
2. Does the "Online Setup" panel appear?

┌──┐
│   Online Setup   │
├──┤
│ Move cursor to desired selection and press ENTER.   │
│   │
└──┘

Yes, go to step 3 on page 5-22.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

3. Press the Enter key to select "Setup display".
4. The "Display Setup" panel will appear on the display.

```
┌─────────────────────────────────────────────────────────────────┐
│                         Display Setup                  More:  +   │
│                                                                   │
│  Move cursor to desired field.  Type the requested information or │
│  press SPACE BAR to select choice.                                │
│                                                                   │
```
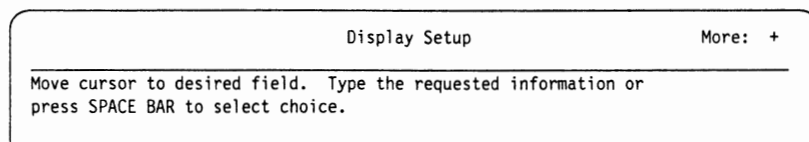
5. Press the F8 key twice to skip two screens.
6. Move the cursor to select "Yes" in the "Clicker" field and press the Space Bar.

```
┌─────────────────────────────────────────────────────────────────┐
│                         Display Setup                  More:  -   │
│                                                                   │
│  Move cursor to desired choice, then press SPACE BAR to select.   │
│                                                                   │
│    Typematic                                                      │
│      Rate . . . . . . . . . .  [Normal]     Fast                  │
│                                                                   │
│      Delay  . . . . . . . . .  Short       Normal       Long      │
│                                                                   │
│    Clicker                                                        │
│      Click  . . . . . . . . .  Yes         No                     │
│                                                                   │
│      Volume . . . . . . . . .  Off          1           2         │
│                                3            4           High       │
│                                                                   │
│      Alarm volume . . . . . . .  Off        1           2         │
│                                 3           4           High       │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
│    F3=Exit     F7=Backward                                        │
│  ───────────────────────────────────────────────────────────────│
│    SETUP                                                          │
└─────────────────────────────────────────────────────────────────┘
```
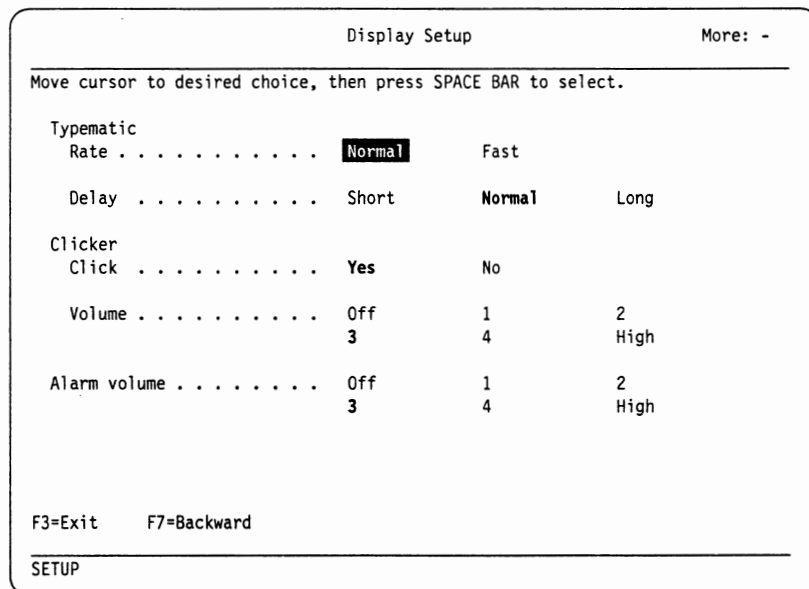
7. Move the cursor to select "High" in the "Volume" of the "Clicker" field and press the Space Bar.
8. The display attribute of " High " should change to yellow.
9. Does the alarm sound change when cursor is moved from 1 to 4 and the Space Bar is pressed?

   Yes, go to step 10.

   No, the display element is failing. Go to "Request for Service" on page 5-40.
10. Move the cursor to select a comfortable sound level and press the Space Bar.
11. While holding down the Alt key (Shift key for the IBM Enhanced Keyboard), press the Setup key; continue the operation.

Symptom

- A single character is typed, but multiple characters are displayed on the screen.

- An unexpected character (a character different from what should appear) is displayed on the screen.

- Typematic keys do not work.

Go to "Keyboard Test" on page 5-35.

┌─ **Symptom** ──┐
│   │
│ Characters are displayed on the screen without typing.   │
│   │
└──┘

The keyboard is failing. Go to "Request for Service" on page 5-40.

Power-on Light Problem

Symptom

The power-on light does not stay on.

1. Set the power switch to Off.
2. Make sure the power cord is tightly connected at both ends (electrical outlet and display element).
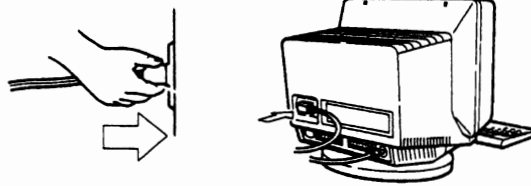
3. Wait approximately one minute.
4. Set the power switch to On.
5. Does the power-on light stay on?
   Yes, continue the operation.
   No, go to step 6.
6. Set the power switch to Off.
7. Unplug the power cord from the electrical outlet.
8. Disconnect the keyboard cable from the logic element.

9. Plug the power cord into the electrical outlet.
10. Wait approximately 30 seconds.
11. Set the power switch to On.
12. Does the power-on light stay on?
    Yes, the keyboard is failing. Go to "Request for Service" on page 5-40.
    No, go to step 13.
13. Set the power switch to Off.
14. Unplug the power cord from the electrical outlet.

DANGER

> **Do not touch the communication cable during an electrical storm. Communication cables can conduct lethal charges of electricity.**

15. Unplug the power cord and disconnect all of the cables from the display station.

16. Turn the display station upside down so that the screen faces you.
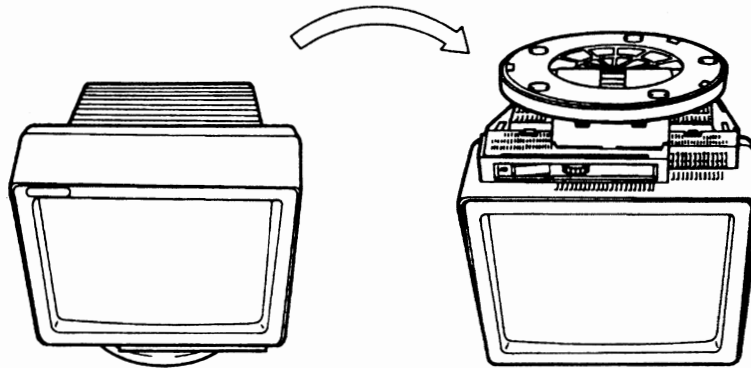
17. If the lift-stand is attached to your display element, go to step 19.
18. Pinch the blue latch and pull up the edge of the stand to remove the stand from the display element.
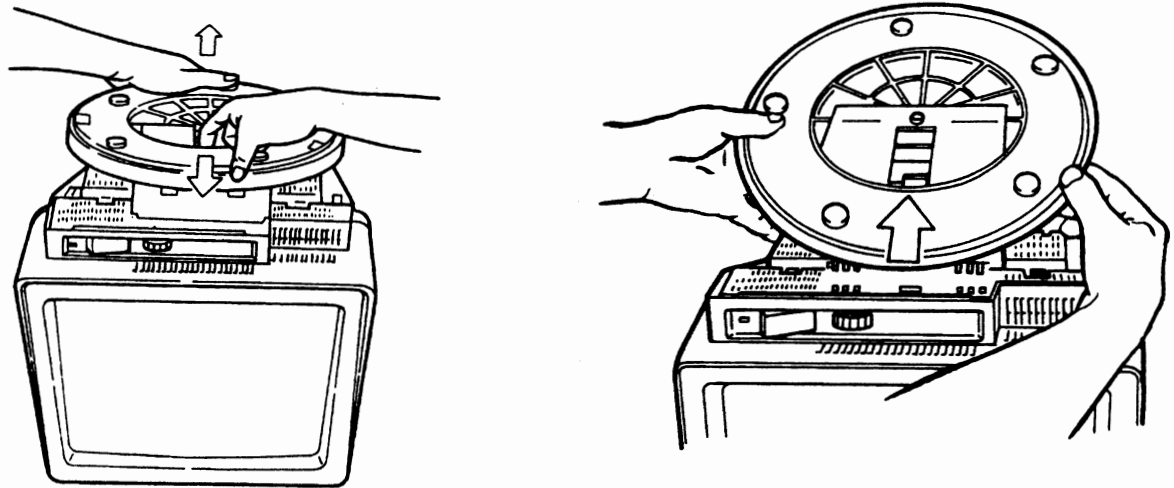
19. Pinch the latch of the logic element and push the logic element to unlock it from the display element.
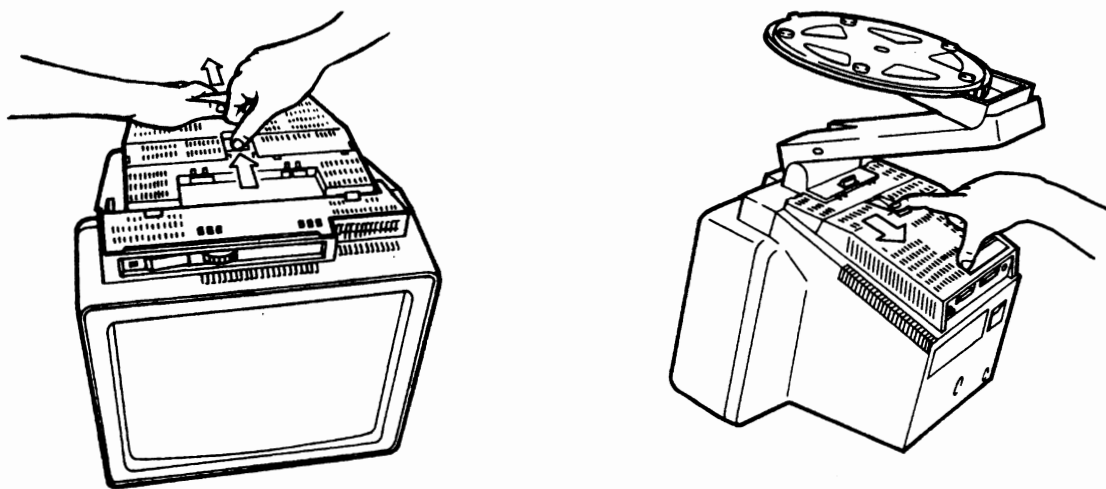
20. Pull up the edge of the logic element to remove the logic element from the display element.
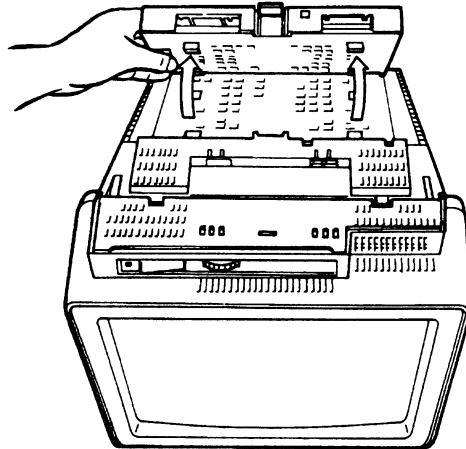
21. Remove the logic element from the display element.
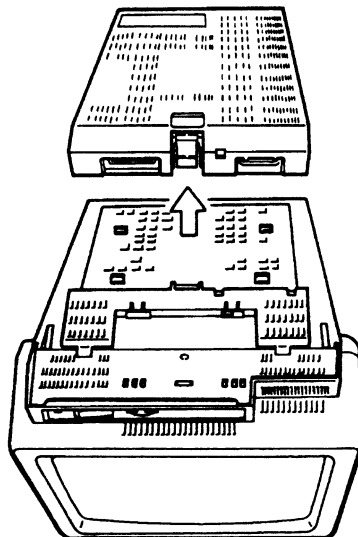
22. Turn the display element right side up.
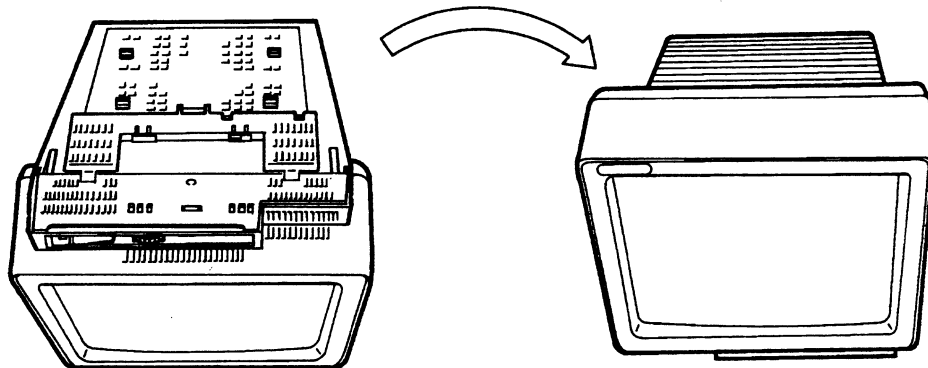
23. Plug the power cord into the display station and electrical outlet.
24. Wait approximately 30 seconds.
25. Set the power switch to On.
26. Does the power-on light stay on?
   Yes, the logic element is failing. Go to "Request for Service" on page 5-40.
   No, go to step 27.
27. Set the power switch to Off.

28. Unplug the power cord from the electrical outlet.
29. Do you have another IBM InfoWindow 3472?
    Yes, replace the power cord with the one from the other IBM InfoWindow 3472. Go to step 30.
    No, the display element is failing. Go to "Request for Service" on page 5-40.
30. Wait approximately 30 seconds.
31. Set the power switch to On.
32. Does the power-on light stay on?
    Yes, the original power cord is failing. Set the power switch to Off and replace the power cord.
    No, the display element is failing. Go to "Request for Service" on page 5-40.

Printer Problem

Printer does not work.

1. Make sure the power switch of your printer is set to On.
2. Make sure the setup values for the printer is correctly defined. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1.
3. Set the power switch of the display station to Off.
4. Press and hold down the Space Bar; set the power switch to On.

5. Hold the Space Bar down and wait approximately ten seconds.
6. Does the "Offline Setup" panel appear?

   Yes, go to step 7.

   No, the keyboard is failing. Go to "Request for Service" on page 5-40.

```
                        Offline Setup
_____
Move cursor to desired selection and press ENTER.
```

7. Move the cursor to select "Test display station" and press the Enter key.
8. While holding down the Alt key, press the F3 key.
9. "T 3" appears in the operator information area.

   ("T 3" appears in the operator information area on the screen and blinks for a short interval.)

```
0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ




_____
 T 3
```

10. Did "T 3" stop blinking?

    Yes, go to step 11.

    No, the printer or the printer cable is probably failing. Contact your system coordinator.

11. Does the print-out have the same pattern that is displayed on the screen?

Yes, the problem is not in your display station. One of the following items is probably failing:

- Host system
- Customization (Model ID)
- Communication cable.

Contact your system coordinator.

No, the printer or the printer cable is probably failing. Contact your system coordinator.

Mouse Problem

> **Symptom**
>
> Mouse does not work.

1. Set the power switch of the IBM InfoWindow 3472 to Off.
2. Press and hold down the Space Bar; set the power switch to On.

3. Hold the Space Bar down and wait approximately ten seconds.
4. Does the "Offline Setup" panel appear?

   Yes, go to step 5.

   No, the keyboard is failing. Go to "Request for Service" on page 5-40.

```
                          Offline Setup

Move cursor to desired selection and press ENTER.
```

5. Move the cursor to select "Test display station" and press the Enter key.

```
                          Offline Setup

Move cursor to desired selection and press ENTER.

  Customize display station

  Update serial number

  Set extended vital product data

  Test display station

  Change keyboard layout

  Customize display controller


F3=Exit

SETUP
```

The Offline Test Entry panel appears.

```
  3472                          0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ

  AA0012345

  0151  09F4600  09F4602    AAAAAAAA    AAAAAAAA    AAAAAAAA

        09F4601  09F4603    AAAAAAAA    AAAAAAAA    AAAAAAAA

  10111111 10111111         AAAAAAAA    AAAAAAAA    AAAAAAAA

  _                          ███████     ███████     ███████




Reset=Exit

TEST
```
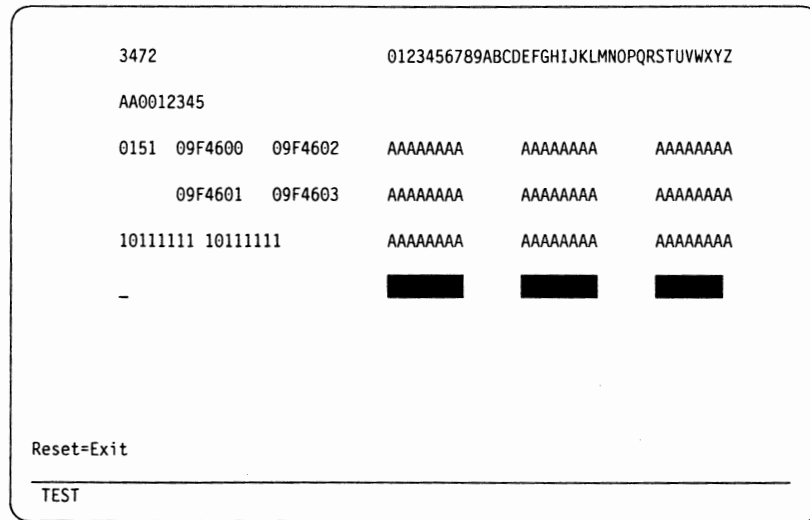
6. Check the following items using the mouse:
   - the cursor moves according to the mouse movement.
   - the cursor style changes from "_" to "█" or vice versa, when the mouse right
     button is pressed.
   - the color of "███████" changes when the cursor is placed on it and the
     mouse left button is pressed.
7. Has the above checking been completed successfully?
   Yes, the problem is not in your display station or the mouse. The host system
       or control unit (including the communication cable) may be failing.
       Contact your system coordinator.
   No, the mouse is failing. Go to "Request for Service" on page 5-40.

Plotter or Tablet Problem

1. Make sure the power switch of the plotter or tablet is set to On.
2. Make sure the plotter or tablet is powered on.
3. Set the power switch of the display station to Off.
4. Press and hold down the Space Bar; set the power switch to On.

5. Hold the Space Bar down and wait approximately ten seconds.
6. Does the "Offline Setup" panel appear?

   Yes, go to step 7.

   No, the keyboard is failing. Go to "Request for Service" on page 5-40.

```
╭─────────────────────────────────────────────────────────────────╮
│                        Offline Setup                              │
│  ───────────────────────────────────────────────────────────────│
│  Move cursor to desired selection and press ENTER.                │
│                                                                   │
╰─────────────────────────────────────────────────────────────────╯
```

7. Move the cursor to select "Test display station" and press the Enter key.

```
╭─────────────────────────────────────────────────────────────────╮
│                        Offline Setup                              │
│  ───────────────────────────────────────────────────────────────│
│  Move cursor to desired selection and press ENTER.                │
│                                                                   │
│    Customize display station                                      │
│                                                                   │
│    Update serial number                                           │
│                                                                   │
│    Set extended vital product data                                │
│                                                                   │
│    ▐Test display station▌                                         │
│                                                                   │
│    Change keyboard layout                                         │
│                                                                   │
│    Customize display controller                                   │
│                                                                   │
│                                                                   │
│  F3=Exit                                                          │
│  ───────────────────────────────────────────────────────────────│
│  SETUP                                                            │
╰─────────────────────────────────────────────────────────────────╯
```

The Offline Test Entry panel appears.

```
      3472                    0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ

      AA0012345

      0151  09F4600   09F4602    AAAAAAAA    AAAAAAAA    AAAAAAAA

            09F4601   09F4603    AAAAAAAA    AAAAAAAA    AAAAAAAA

      10111111 10111111         AAAAAAAA    AAAAAAAA    AAAAAAAA

      _                         ████████    ████████    ████████




  Reset=Exit

  ────────────────────────────────────────────────────────────
  TEST
```

8. While holding down the Alt key, press the F5 key. You should see "T 5" in the operator information area.

9. Do you have a plotter?

   Yes, go to step 11.

   No, you have a tablet and go to the next step.

10. Do you see "QT" in the operator information area?

    Yes, the problem is not in your display station or in the tablet. The host system or control unit (including the communication cable) may have a problem. Contact your system coordinator.

    No, the tablet has a problem. Contact your system coordinator.

11. Do you see "QP" in the operator information area?

    Yes, go to step 12.

    No, refer to "Plotter" on page 2-31 and make sure that the correct information is used for the plotter setup. If the problem continues, contact your system coordinator.

12. Do you see the IBM machine type of your plotter at the right of "QP" in the operator information area?

    Yes, the problem is not in your display station or in the plotter. The host system or control unit (including the communication cable) may have a problem. Contact your system coordinator.

    No, set the correct IBM machine type for your plotter in setup mode. Refer to Appendix A, "Setup Mode and Printer Control Operations" on page A-1 for setting the correct "Plotter type".

Mechanical Problems

In each case below, you should request service if the problem prevents normal operation of your display station.

```
┌─ Symptom ──────────────────────────────────────────────────────────────┐
│                                                                         │
│  The security key does not work.                                        │
│                                                                         │
└─────────────────────────────────────────────────────────────────────────┘
```

The security keylock of the logic element is failing. Go to "Request for Service" on page 5-40.

```
┌─ Symptom ──────────────────────────────────────────────────────────────┐
│                                                                         │
│  The cover is damaged.                                                  │
│                                                                         │
└─────────────────────────────────────────────────────────────────────────┘
```

Go to "Request for Service" on page 5-40.

```
┌─ Symptom ──────────────────────────────────────────────────────────────┐
│                                                                         │
│  The stand or the lift-stand is damaged.                                │
│                                                                         │
└─────────────────────────────────────────────────────────────────────────┘
```

Go to "Request for Service" on page 5-40.

Keyboard Test

1. Set the power switch to Off.
2. Press and hold down the Space Bar; then set the power switch to On.

3. Hold the Space Bar down and wait approximately ten seconds.
4. Does the "Offline Setup" panel appear?

```
                              Offline Setup

Move cursor to desired selection and press ENTER.
```
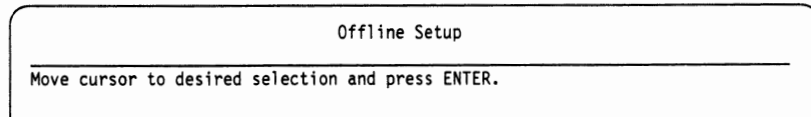
Yes, go to step 5.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

5. Move the cursor to select "Test display station" and press the Enter key.
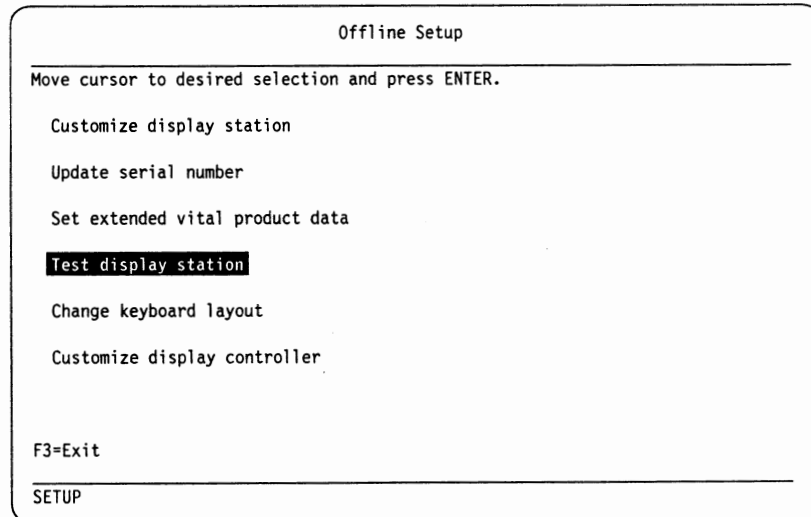
```
                              Offline Setup

Move cursor to desired selection and press ENTER.

   Customize display station

   Update serial number

   Set extended vital product data

   Test display station

   Change keyboard layout

   Customize display controller


F3=Exit

SETUP
```

6. Does the Offline Test Entry panel appear on the screen?

```
    3472                    0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ

    AA0012345

    0151  09F4600   09F4602     AAAAAAAA     AAAAAAAA     AAAAAAAA

          09F4601   09F4603     AAAAAAAA     AAAAAAAA     AAAAAAAA

    10111111 10111111          AAAAAAAA     AAAAAAAA     AAAAAAAA

    _                          ███████      ███████      ███████




Reset=Exit
─────────────────────────────────────────────
TEST
```
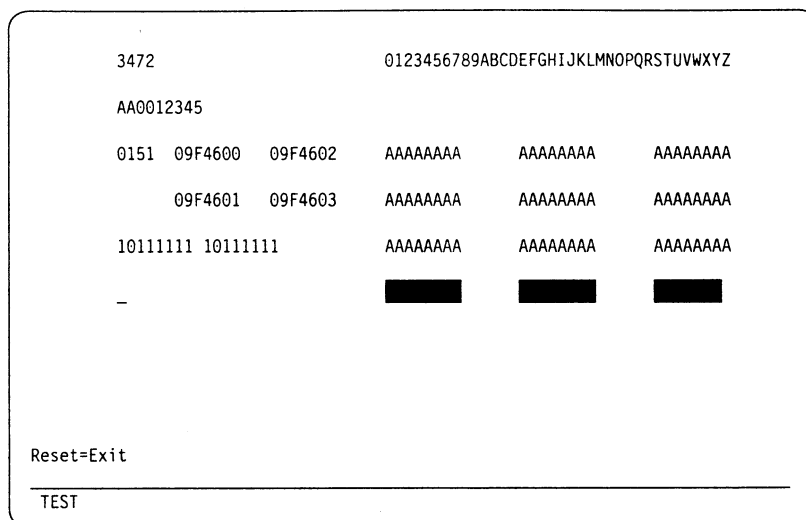
Yes, go to step 7.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

7. While holding down the Alt key, press the F2 key.
8. Does your keyboard layout figure appear at the center part of the screen?
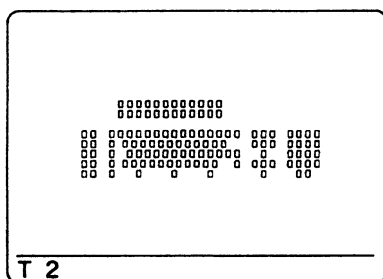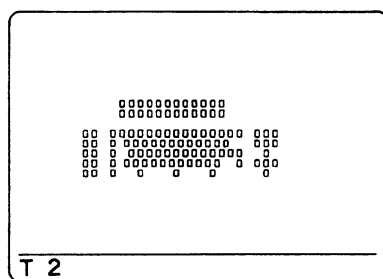
122/124-key Keyboard	104-key Keyboard	IBM Enhanced Keyboard
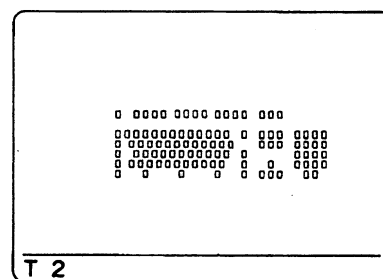
Yes, go to step 9.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

9. Press the key that has a problem, several times. Does the equivalent key shown on the screen change from □ to ■ , or vice versa?

Yes, go to step 10.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

10. Press, one at a time, all of the keys on the keyboard.

Does the equivalent key shown on the screen change from □ to ■ , or vice versa?

Yes, go to step 11.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

11. Set the power switch to Off; wait a few seconds.

12. Press and hold down the Space Bar; then set the power switch to On.

13. Hold the Space Bar down and wait approximately ten seconds.
14. Does the "Offline Setup" panel appear?

```
┌─────────────────────────────────────────────────────────────────┐
│                        Offline Setup                              │
├───────────────────────────────────────────────────────────────── │
│ Move cursor to desired selection and press ENTER.                 │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```
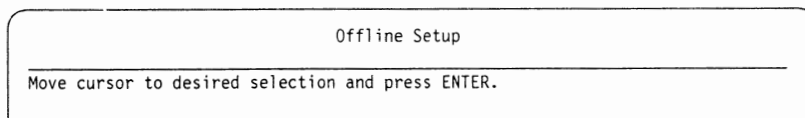
Yes, go to step 15.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

15. Press the Enter key to select "Customize display station".

```
┌─────────────────────────────────────────────────────────────────┐
│                        Offline Setup                              │
├───────────────────────────────────────────────────────────────── │
│ Move cursor to desired selection and press ENTER.                 │
│                                                                   │
│   ▌Customize display station▐                                     │
│                                                                   │
│    Update serial number                                           │
│                                                                   │
│    Set extended vital product data                                │
│                                                                   │
│    Test display station                                           │
│                                                                   │
│    Change keyboard layout                                         │
│                                                                   │
│    Customize display controller                                   │
│                                                                   │
│                                                                   │
│  F3=Exit                                                          │
├───────────────────────────────────────────────────────────────── │
│  SETUP                                                            │
└─────────────────────────────────────────────────────────────────┘
```
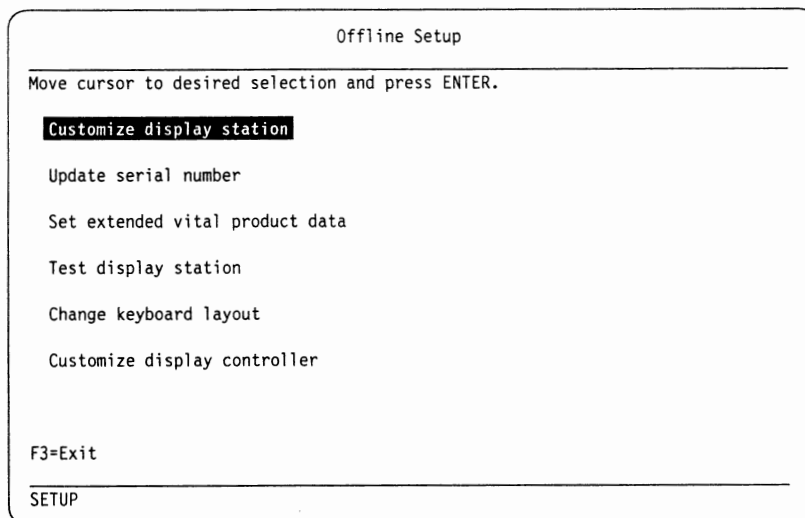
16. Does the "Customization" panel appear on the screen?

```
┌─────────────────────────────────────────────────────────────────┐
│                        Customization              More:  +        │
├───────────────────────────────────────────────────────────────── │
│ Move cursor to desired choice, then press SPACE BAR to select.    │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```
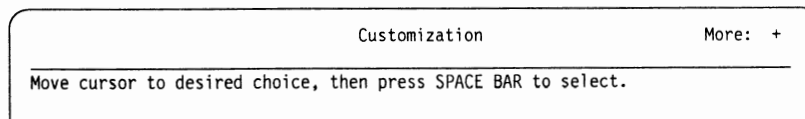
Yes, go to step 17.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

17. Check "Keyboard type" selection with your keyboard. If you or your system coordinator changed the keyboard layout using the keyboard definition function, "Keyboard type" selection should be other than "Standard". Contact your system coordinator and check the following items:
    - The keyboard layout has been changed
    - The control unit customization is appropriate.

Logic Element Check Procedure

1. Set the power switch to Off.
2. Unplug the power cord from the electrical outlet.

DANGER

> **Do not touch the communication cable during an electrical storm. Communication cables can conduct lethal charges of electricity.**

3. Disconnect the communication cable.
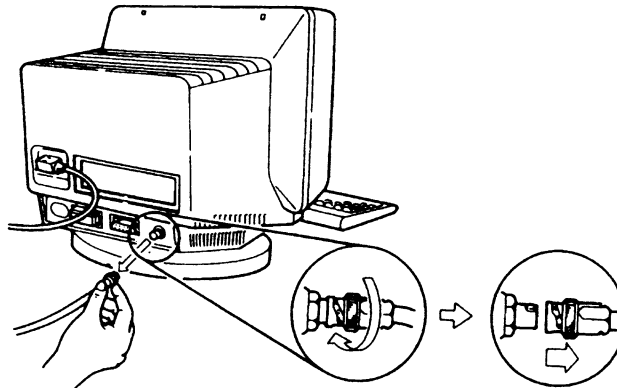
Note: If you do not disconnect this cable, the test will fail.

4. Plug the power cord into the electrical outlet.
5. Press and hold down the Space Bar, then set the power switch to On.
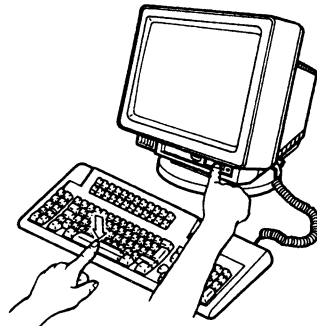
6. Hold the Space Bar down and wait approximately ten seconds.
7. Does the "Offline Setup" panel appear?

```
                        Offline Setup

Move cursor to desired selection and press ENTER.

```

Yes, go to step 8.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

8. Move the cursor to select "Test display station" and press the Enter key.

```
┌─────────────────────────────────────────────────────────────────┐
│                          Offline Setup                          │
├─────────────────────────────────────────────────────────────────┤
│ Move cursor to desired selection and press ENTER.               │
│                                                                 │
│    Customize display station                                    │
│                                                                 │
│    Update serial number                                         │
│                                                                 │
│    Set extended vital product data                              │
│                                                                 │
│    ▐Test display station▌                                       │
│                                                                 │
│    Change keyboard layout                                       │
│                                                                 │
│    Customize display controller                                 │
│                                                                 │
│                                                                 │
│                                                                 │
│  F3=Exit                                                        │
├─────────────────────────────────────────────────────────────────┤
│  SETUP                                                          │
└─────────────────────────────────────────────────────────────────┘
```

9. Does the Offline Test Entry panel appear on the screen?

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                 │
│     3472                      0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ│
│                                                                 │
│     AA0012345                                                   │
│                                                                 │
│     0151  09F4600   09F4602   AAAAAAAA   AAAAAAAA   AAAAAAAA     │
│                                                                 │
│           09F4601   09F4603   AAAAAAAA   AAAAAAAA   AAAAAAAA     │
│                                                                 │
│     10111111 10111111         AAAAAAAA   AAAAAAAA   AAAAAAAA     │
│                                                                 │
│     _                         ▓▓▓▓▓▓     ▓▓▓▓▓▓     ▓▓▓▓▓▓       │
│                                                                 │
│                                                                 │
│                                                                 │
│                                                                 │
│  Reset=Exit                                                     │
├─────────────────────────────────────────────────────────────────┤
│  TEST                                                           │
└─────────────────────────────────────────────────────────────────┘
```

Yes, go to step 10.

No, the keyboard is failing. Go to "Request for Service" on page 5-40.

10. While holding down the Alt key, press the F1 key. "T 1" appears in the operator information area and blinks a few times.

11. Does "LL" appear in the operator information area on the screen?

   Yes, the logic element is failing. Go to "Request for Service" on page 5-40.

   No, one of the following items is probably failing.

   - Host system
   - Control unit
   - Communication cable
   - Logic element
   - Customization.

   Contact your system coordinator.

Request for Service

When your display station requires service, perform the following steps.

1. Set the power switch to Off.

2. Be prepared to give the following:

   • Your machine type and serial number
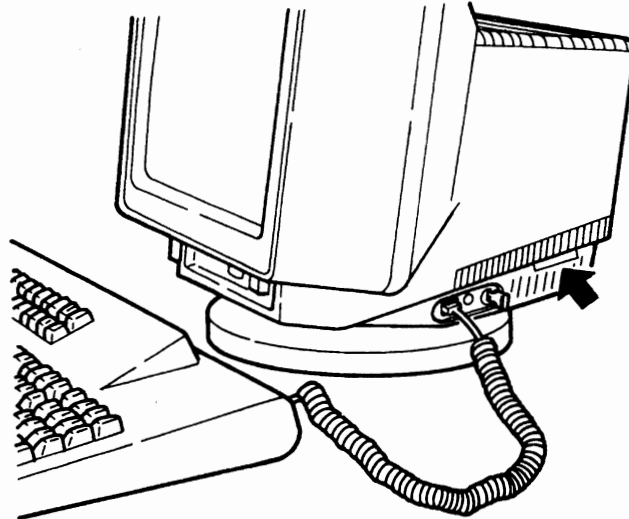
   • Symptom
   • Your telephone number, address, and zip code (U.S. only).

3. Call the toll-free number 1-800-IBM-SERV (for U.S. only) or contact your IBM Service Center (for other countries).

   The IBM Service Center will verify your warranty and maintenance agreement status, and will provide you with information on the action to be taken.

4. When you need to remove a failing element, or pack it for shipment, go to "Removal and Packing" on page 5-42.

5. When you exchange an element, see Chapter 1, "Setup Instructions" on page 1-1.

ECCO (for the U.S. only)

The following parts list is used when you request service through the ECCO (Electronic Customer Communications Option) system. The ECCO system is available only in the U.S. If the logic element is failing, use the part number of the logic card. If the color display element is failing, use the part number of the analog/video card.

Description	Part Number
Display Element 14 inch, Color, U.S.	16F1200
Display Element 14 inch, Color, U.S., Analog/video card	39F9225
Display Element 14 inch, Color, U.S., Front cover	39F9315
Display Element 14 inch, Color, U.S., Rear cover	39F9316
Display Element 14 inch, Color, U.S., CRT and Yoke assembly	39F7590
Logic Element, U.S., Logic element	23F2183
Logic Element, U.S., Logic card	38F4933
Logic Element, U.S., Cover group	23F2218
Logic Element, U.S., I/O plate	23F2205
122-key Keyboard, U.S. English typewriter	1394801
104-key Keyboard, U.S. English	09F4230
IBM Enhanced Keyboard, U.S. English	1394802
122-key Keyboard, U.S. English APL2	1394806
Display Stand	09F4221
Power Cord, 2.8 m (9 ft), U.S.	6952297
Power Cord, 1.8 m (6 ft), U.S. (Chicago)	6952298

Removal and Packing

This section describes how to remove the display element, logic element, keyboard, and stand. Refer to Chapter 1, "Setup Instructions" on page 1-1 when replacing the display station elements.

Display Station Element Removal

1 Set the power switch to Off.

2 Unplug the power cord at both ends (electrical outlet and display element).
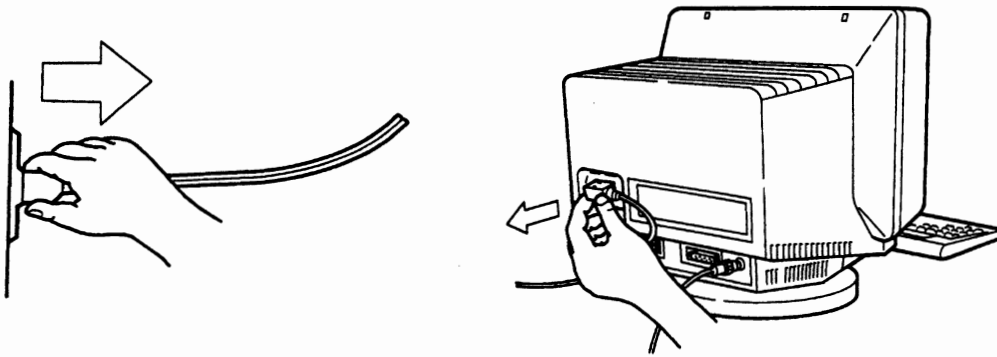
DANGER

> **Do not touch the communication cable during an electrical storm. Communication cables can conduct lethal charges of electricity.**

3 Unscrew and pull out all cables from the display element and logic element.
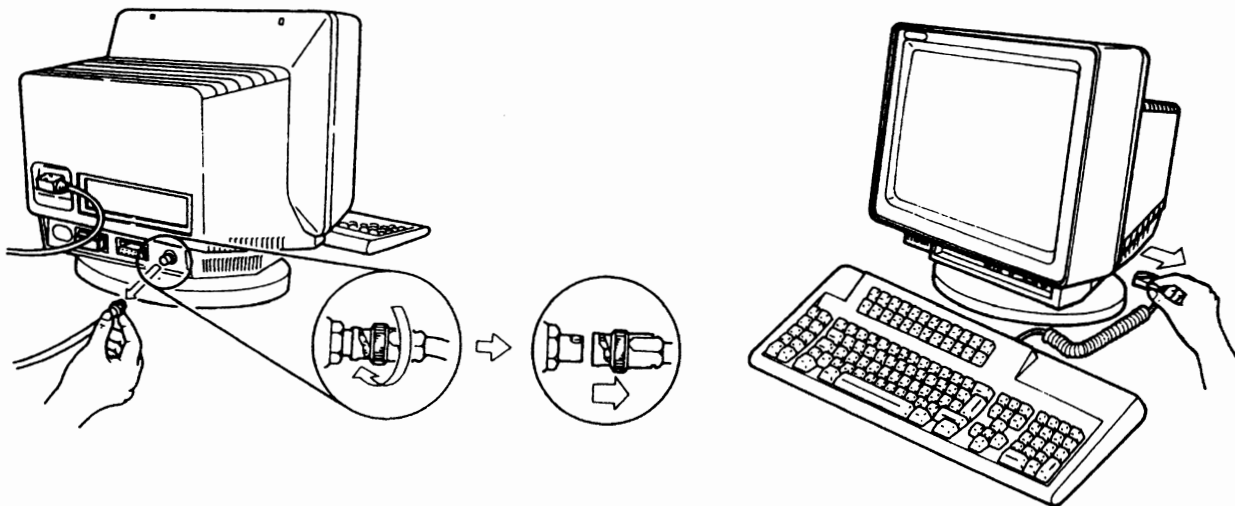
4 Turn the display station upside down so that the screen faces you.
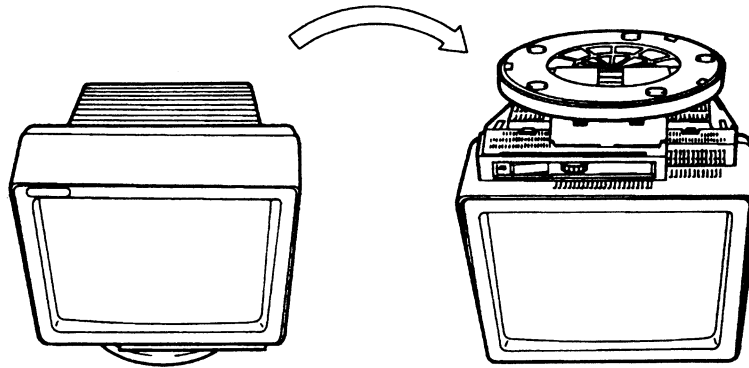
5 If the lift-stand is attached to your display element, go to step 8 on page 5-44.

6 Pinch the blue latch and pull up the edge of the stand to remove the stand from the display element.
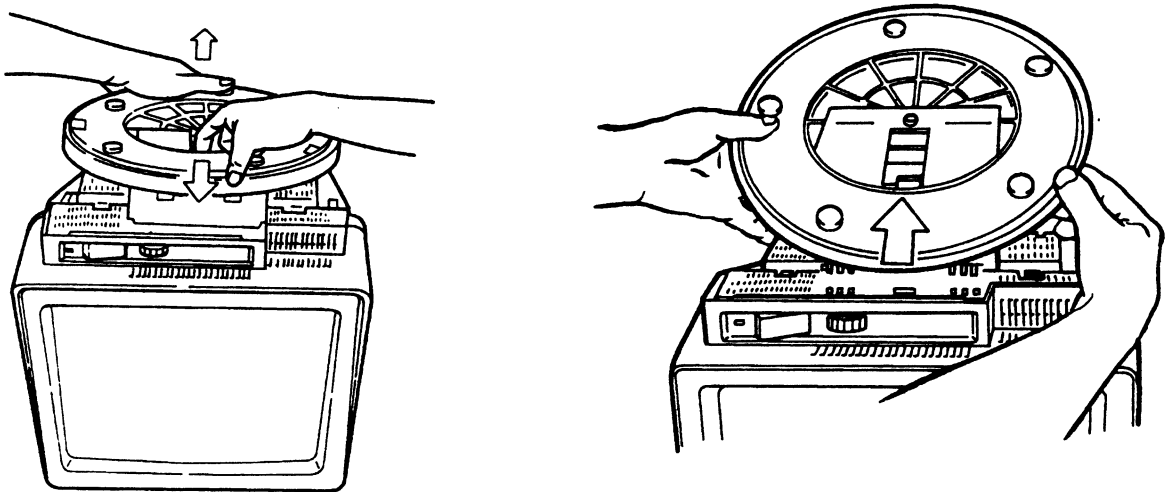
7 Go to step 11 on page 5-45.

8 Push and hold the blue latch to unlock the lift-stand from the display element.
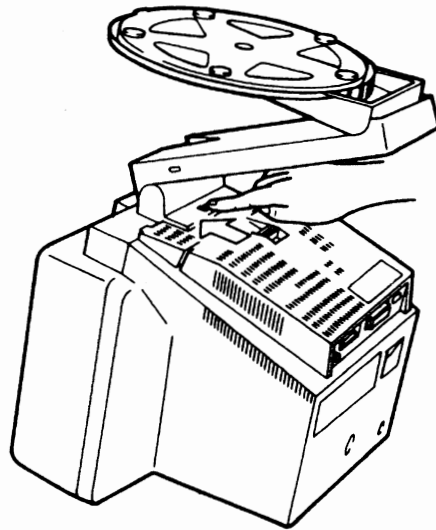
9 Pull up the edge of the lift-stand to remove the stand from the display element.
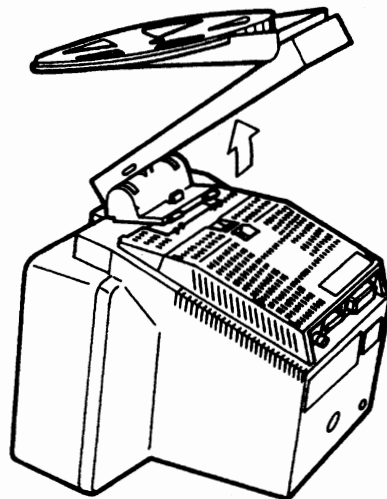
10 Remove the lift-stand from the display element.
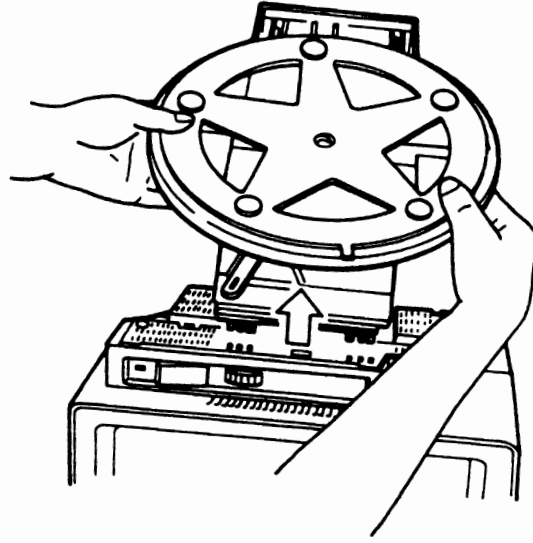
11 Pinch the latch of the logic element and push the logic element to unlock it from the display element.
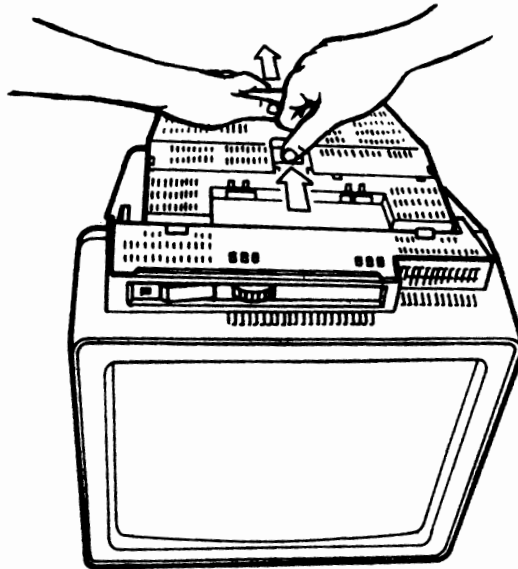
12 Pull up the edge of the logic element to remove the logic element from the display element.
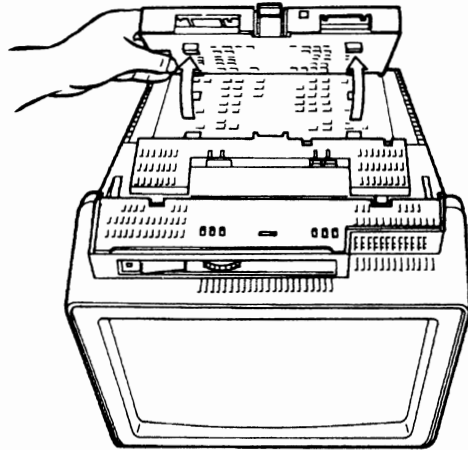
13 Remove the logic element from the display element.
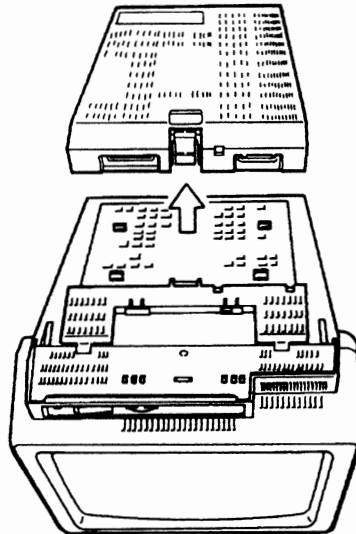
14 Go to "Packing Display Station Element" on page 5-47 for instructions on returning the failing element to IBM.

Packing Display Station Element
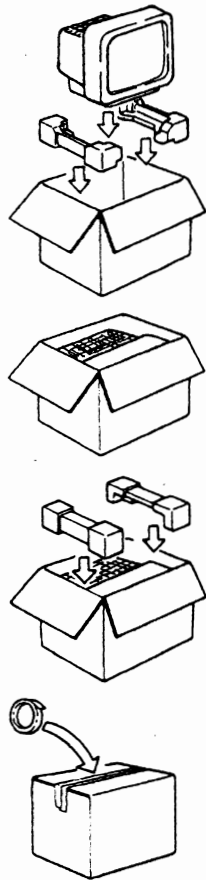
Display Element	Keyboard	Logic Element
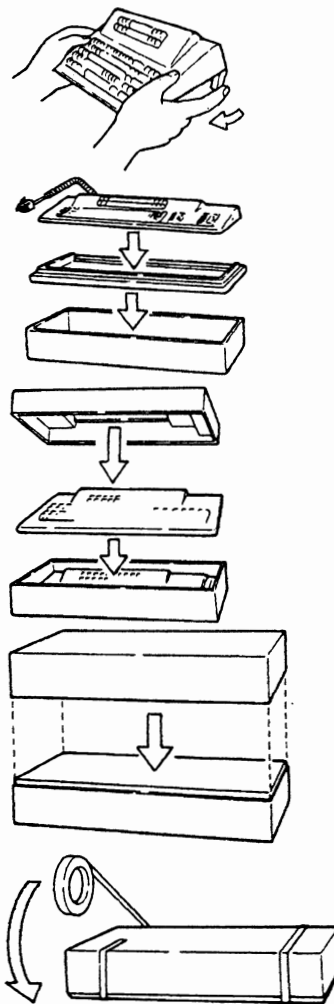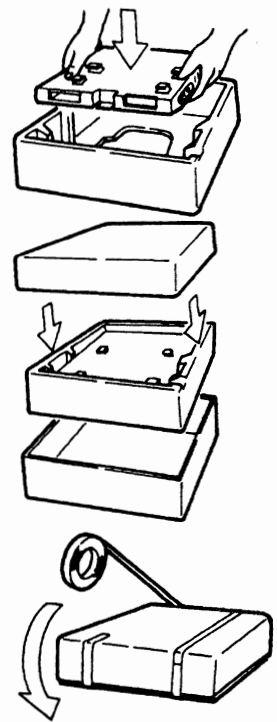
Note:

- Keep the power cord.
- Remove and keep all special key caps (if any) and overlay, and reinstall the standard key caps.
- Send the two security keys with the logic element.

Appendix A. Setup Mode and Printer Control Operations

The following chart shows the items that you can change for your operational environment.

Table A-1 (Page 1 of 3). Setup Mode Operations

Selection Item	Panel Title	Page	Description
Alarm volume	Display Setup	A-16	You can change the alarm volume in six levels including "Off".
Auto dim	Display Setup	A-16	The screen becomes blank if you do not press a key or the display station does not receive any data from the host in the time specified by the item "Delay".
Cancel print	Printer Control	A-29	When you select this item, you can cancel the printing job from the host system.
Characters per inch[2]	Printer Setup	A-25	You can select the number of characters printed per inch.
Clicker	Display Setup	A-16	You can turn on/off and change the volume of the audible clicker.
Color mapping[2]	Printer Setup	A-25	You can enable or disable the printing of each color.
Country Extended Code Page (CECP)	Customization[1]	A-4	You can select the use of the extended character set or of the base character set.
Cursor (alphanumeric and graphic)	Display Setup	A-16	You can change the style and blinking state of the cursor. Color of the graphics cursor can be changed.
Customize display controller	Offline Setup	A-23	You can use the display station to customize the control unit.
Form Feed	Customization[1] Printer Control	A-4 A-29	In "Customization", you can define when the form feed is executed for the subsystem print. In "Printer Control", the printer advances the paper one page.
Form feeds after print[2]	Printer Setup	A-25	You can turn on or off form-feed after each local screen print.
Graphics session	Customization[1]	A-4	You can assign a graphics session to one of the 3270 host sessions.
Keyboard layout	Customization[1]	A-4	If you change the keyboard layout using the keyboard definition utility (refer to Appendix C, "Keyboard Definition Utility" on page C-1), you need to change this value.
Line Feed	Printer Control	A-29	When you select this item, the printer advances the paper one line.
Lines per inch[2]	Printer Setup	A-25	You can select the number of lines printed per inch.
Lines per page[2]	Printer Setup	A-25	You can select the number of lines printed per page.

---

[1] Before you go into these panels, you need to complete your host session (job with the host application program). These panels will detach the host session from your display station.

[2] These selections will not be provided when "Subsystem" is selected for "Model/Type" of "Printer" selection.

[3] Available for the U.S. only.

Table A-1 (Page 2 of 3). Setup Mode Operations

Selection Item	Panel Title	Page	Description
Machine serial	Serial Number[1]	A-9	This number is used for the network asset management. The original setting of this value is the serial number of the display station.
Margin: top, bottom, left[2]	Printer Setup	A-25	You can define top, bottom, and left margins of the print area on the local printer.
Mono case[3]	Display Setup	A-16	When "Yes" is selected, lowercase alphabetical characters will appear in uppercase.
Numeric lock	Customization[1]	A-4	When "Yes" is selected, you cannot enter alphabetic characters in the numeric field that is defined by the host application program.
Paper height[2]	Printer Setup	A-25	You can define the paper height.
Paper width[2]	Printer Setup	A-25	You can define the paper width.
PA1	Printer Control	A-29	When you select this item, you can send the PA1 signal to the host system.
PA2	Printer Control	A-29	When you select this item, you can send the PA2 signal to the host system.
Plotter type	Customization[1]	A-4	When a non-IBM plotter is attached, the compatible IBM plotter machine type has to be entered. Otherwise this field should be left blank.
Printer session	Customization[1]	A-4	If you want to submit a host initiated print job to your printer, you have to assign a printer session to one of the host sessions.
Printer • Model/Type • continuous form • code page	Customization[1]	A-4	You can select or change the printer model/type, continuous form, and code page.
Print quality[2]	Printer Setup	A-25	You can change the print quality in three degrees.
Printer session options	Customization[1]	A-4	If "Yes" is selected for "Printer session", you can select the options for the host addressable print operation. Refer to "Printer Session Options" on page A-30 for details of each item.
Record/Play options	Test display station	A-19	You can change the record/play function to either prohibit recording of the non-display field input (like a password input), or to be totally disabled. Once the record/play function is changed, the original function can not be recovered.
Row/column indicator	Display Setup	A-16	When turned on, the current row and column numbers are displayed in the operator information area.
Rule line	Display Setup	A-16	You can change the characteristics of the rule line: style, color or intensity, and following-cursor.
Screen rows x columns	Display Setup	A-16	You can select one of four screen sizes (number of rows and columns) for the display area. To define each session (window) screen size, see "Session rows x columns".
Scroll start	Customization[1]	A-4	You can specify the number of characters from the window border for the window scrolling start position. The window scrolling starts when the cursor reaches the position specified.

Table A-1 (Page 3 of 3). Setup Mode Operations

Selection Item	Panel Title	Page	Description
SCS format over-ride	Customization[1]	A-4	You can select a subsystem print operation to override the format controls currently set on the subsystem printer.
Session names	Customization[1]	A-4	You should assign an alphabetical character to the session "Short name" that you will activate. A "Long name" will automatically appear when a "Short name" is assigned. To activate the session, you also have to confirm that the control unit customization and system generation are appropriately done for the session.
Session rows x columns	Customization[1]	A-4	You can define the screen size for each session. When you define this value, you need to check the host system requirement for the screen size. If the value is not appropriate for the host system, you may not be able to communicate with host applications correctly. If troubled, ask your system coordinator for the appropriate screen size for the host system.
Trim border[2]	Printer Setup	A-25	You can select either white or green for the color of the trimming rectangle.
Typematic	Display Setup	A-16	You can change the rate and delay time of the keyboard typing speed.
Underscore style	Customization[1]	A-4	The style of the underscore can be selected as either broken or continuous bar.
Extended vital product data	Extended vital product data	A-13	You can enter data to be used for the network asset management.
VM clear	Customization[1]	A-4	When "No" is selected, pressing the "Clear" key sets the session back to the primary screen size. Setting this value to "Yes" is recommended.
Wide paper[2]	Printer Setup	A-25	You can select wide paper for the printer use.

Panel Operation Rules

Any selections that you make are shown in reverse video on the screen. As you use the cursor move keys, ←, →, ↓, ↑ and the other cursor control keys, the reverse video image moves from item to item. To establish the selection, press the Space Bar. To proceed to the next step, press the F7 key (for the previous screen) or F8 key (for the next screen). To exit from the panel, press the F3 key.

For the "Customization" panel, pressing the F11 key resets the values to the IBM defaults. When the F12 key is pressed, you can exit from the panel without reflecting the changes you made on the panel.

Note: You can go to the "Offline Setup" panel by powering on the display station while holding down the Space Bar.

Customization

If a host session is in process (working with the host application program), you need to complete the session before going into the "Customization" panel.

The following steps show the procedure that you need to follow for setting the appropriate display station and auxiliary device characteristics.

1. When the display station is operational, press the SetUp key while holding down the Shift (Alt for the 104/122/124-key keyboard) key.

104/122/124-key keyboard   IBM Enhanced keyboard

You will see the "Online Setup" panel.

```
╭────────────────────────────────────────────────────────────────────╮
│                          Online Setup                                │
│ ──────────────────────────────────────────────────────────────────  │
│ Move cursor to desired selection and press ENTER.                    │
│                                                                      │
```

Note: When "Subsystem" is selected for "Model/Type" in "Customization" panel, "Setup printer" does not appear.

2. Select "Go to offline setup" by using the cursor move keys and by pressing the Enter key. You should see the following warning message for host session disconnection: "Sessions will be terminated, press Enter to continue or any other key to quit.".

```
╭────────────────────────────────────────────────────────────────────╮
│                          Online Setup                                │
│ ──────────────────────────────────────────────────────────────────  │
│ Move cursor to desired selection and press ENTER.                    │
│                                                                      │
│    Setup display                                                     │
│                                                                      │
│    Setup printer                                                     │
│                                                                      │
│    Setup window                                                      │
│                                                                      │
│    Go to offline setup                                               │
│                                                                      │
│                                                                      │
│                                                                      │
│                                                                      │
│                                                                      │
│                                                                      │
│    F3=Exit                                                           │
│ ──────────────────────────────────────────────────────────────────  │
│    SETUP                                                             │
╰────────────────────────────────────────────────────────────────────╯
```

3. Press the Enter key to continue. The "Offline Setup" panel should appear.

```
┌──────────────────────────────────────────────────────────────────────┐
│                          Offline Setup                                 │
├──────────────────────────────────────────────────────────────────────┤
│ Move cursor to desired selection and press ENTER.                      │
│                                                                        │
│                                                                        │
└──────────────────────────────────────────────────────────────────────┘
```

4. Select "Customize display station" by using the cursor move keys and by pressing the Enter key.

```
┌──────────────────────────────────────────────────────────────────────┐
│                          Offline Setup                                 │
├──────────────────────────────────────────────────────────────────────┤
│ Move cursor to desired selection and press ENTER.                      │
│                                                                        │
│ Customize display station                                              │
│                                                                        │
│ Update serial number                                                   │
│                                                                        │
│ Set extended vital product data                                        │
│                                                                        │
│ Test display station                                                   │
│                                                                        │
│ Change keyboard layout                                                 │
│                                                                        │
│ Customize display controller                                           │
│                                                                        │
│                                                                        │
│                                                                        │
│ F3=Exit                                                                │
├──────────────────────────────────────────────────────────────────────┤
│ SETUP                                                                  │
└──────────────────────────────────────────────────────────────────────┘
```

Note: "Set extended vital product data" will appear dependant on the control unit support.

You will see the "Customization" panel.

```
┌──────────────────────────────────────────────────────────────────────┐
│                          Customization                        More:  + │
├──────────────────────────────────────────────────────────────────────┤
│ Move cursor to desired choice, then press SPACE BAR to select.         │
│                                                                        │
│    Keyboard layout  . . . . . .  Standard   User1     User2     User3  │
│                                                                        │
│    Numeric lock . . . . . . . .  Yes        No                         │
│                                                                        │
│    Underscore style . . . . . .  - - -      ─                          │
│                                                                        │
│    CECP . . . . . . . . . . . .  Yes        No                         │
│                                                                        │
│    VM clear . . . . . . . . . .  Yes        No                         │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│ F3=Exit              F8=Forward     F11=Reset values      F12=Cancel   │
├──────────────────────────────────────────────────────────────────────┤
│ SETUP                                                                  │
└──────────────────────────────────────────────────────────────────────┘
```

You have a maximum of five selection panels including the panel above. Use the F8 key for the next panel and the F7 key for the previous panel.

```
┌─────────────────────────────────────────────────────────────────┐
│                       Customization              More: -+         │
│  ───────────────────────────────────────────────────────────     │
│  Move cursor to desired field.  Type the requested information or │
│  press SPACE BAR to select choice.                                │
│                                                                   │
│    Printer                                                        │
│      Model/Type . . . . . . . . ▉Subsystem▉  4201    4202    4207 │
│                                  4208      5202    5204           │
│      SCS format override  . . .  Yes       No                     │
│      Form feed  . . . . . . . .  Before    After   Both    None   │
│      Continuous forms . . . . .  Yes       No                     │
│      Code page  . . . . . . . .  437       850                    │
│                                                                   │
│      Plotter type . . . . . . . .  ___      0-9 Input if OEM attached │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
│    F3=Exit      F7=Backward    F8=Forward    F11=Reset values    F12=Cancel │
│  ───────────────────────────────────────────────────────────     │
│  SETUP                                                            │
└─────────────────────────────────────────────────────────────────┘
```

Notes:

a. When "Subsystem" is selected for the "Model/Type", "Continuous forms" does not appear.

b. "Code page" selection appears only when the 4201 or 4202 is attached to the display station. By selecting "437", APL characters can be printed in alphanumeric mode. When you select "850", APL characters can not be printed but the printing is faster than selecting "437".

c. "SCS format override" and "Form feed" appear only when "Subsystem" is selected for "Model/Type".

In the following panel, you should assign one alphabetical character for a short name and a long name (optional) with a maximum of eight characters to the session that you will activate.

Type the requested information to the underlined area (if needed) and select the sessions by pressing the Space Bar.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                            Customization                      More: -+    │
│ ───────────────────────────────────────────────────────────────────────  │
│ Move cursor to desired field.  Type the requested information or          │
│ press SPACE BAR to select choice.                                         │
│                                                                           │
│    Session names                    Short Name  Long Name                 │
│                                      A-Z         A-Z 0-9                   │
│       Host1  . . . . . . . . . .     █A█         HOST1___                  │
│       Host2  . . . . . . . . . .     B           HOST2___                  │
│       Host3  . . . . . . . . . .     C           HOST3___                  │
│       Host4  . . . . . . . . . .     D           HOST4___                  │
│       Host5  . . . . . . . . . .     E           HOST5___                  │
│                                                                           │
│       AEA host . . . . . . . . .     _           _____                 │
│                                                                           │
│       Notepad  . . . . . . . . .     N           NOTEPAD_                  │
│                                                                           │
│    Graphics session . . . . . .      None  A     B     C     D     E       │
│                                                                           │
│    Printer session  . . . . . .      None  A     B     C     D     E       │
│                                                                           │
│ F3=Exit     F7=Backward    F8=Forward    F11=Reset values    F12=Cancel    │
│ ───────────────────────────────────────────────────────────────────────  │
│ SETUP                                                                     │
└─────────────────────────────────────────────────────────────────────────┘
```

Note: When "Subsystem" is selected for the "Model/Type", "Printer Session" does not appear.

According to the session defined, you need to define each session screen size shown in the following panel.

When "Session rows x columns" is assigned larger than "Screen rows x columns", you cannot see the entire session screen in windowed mode.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                            Customization                      More: -+    │
│ ───────────────────────────────────────────────────────────────────────  │
│ Move cursor to desired choice, then press SPACE BAR to select.            │
│                                                                           │
│    Session rows x columns                                                 │
│       A-HOST1  . . . . . . . . .  24 x 80   █32 x 80█                      │
│       B-HOST2  . . . . . . . . .  24 x 80    32 x 80   43 x 80   27 x 132  │
│       C-HOST3  . . . . . . . . .  24 x 80    32 x 80   43 x 80   27 x 132  │
│       D-HOST4  . . . . . . . . .  24 x 80    32 x 80   43 x 80   27 x 132  │
│       E-HOST5  . . . . . . . . .  24 x 80    32 x 80   43 x 80   27 x 132  │
│                                                                           │
│       N-NOTEPAD  . . . . . . . .  24 x 80    32 x 80   43 x 80   27 x 132  │
│                                                                           │
│                                                                           │
│                                                                           │
│                                                                           │
│                                                                           │
│ F3=Exit     F7=Backward    F8=Forward    F11=Reset values    F12=Cancel    │
│ ───────────────────────────────────────────────────────────────────────  │
│ SETUP                                                                     │
└─────────────────────────────────────────────────────────────────────────┘
```

Notes:

    a. For a graphics session (if assigned), the "43 x 80" and "27 x 132" screen sizes are not displayed. You need to set the same screen size for the "Session rows x columns" of the graphics session as the base screen size "Screen rows x columns".

    b. For a printer session (if assigned), the screen size selection does not appear.

When "Printer session" is assigned to one of the host sessions, the following panel appears.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                          Customization                       More: -      │
│                                                                           │
│  ─────────────────────────────────────────────────────────────────────   │
│  Move cursor to desired choice, then press SPACE BAR to select.           │
│                                                                           │
│    Printer Session Options                                                │
│                                                                           │
│      Suppress nulls . . . . . . . . . . . . . . . . . . .▐Yes▌    No       │
│                                                                           │
│      Suppress automatic new line when                                     │
│        CR at maximum print position + 1 . . . . . . . . . Yes    No        │
│        FF at print end  . . . . . . . . . . . . . . . . . Yes    No        │
│        NL at maximum print position + 1 . . . . . . . . . Yes    No        │
│                                                                           │
│      FF ignored when not in first print position  . . . . Yes    No        │
│                                                                           │
│      FF takes position if followed by data  . . . . . . . Yes    No        │
│                                                                           │
│      FF at end of print . . . . . . . . . . . . . . . . . Yes    No        │
│                                                                           │
│                                                                           │
│  F3=Exit    F7=Backward              F11=Reset values    F12=Cancel        │
│  ─────────────────────────────────────────────────────────────────────   │
│  SETUP                                                                     │
└─────────────────────────────────────────────────────────────────────────┘
```

5. Complete your selection by using the cursor move keys and by pressing the Space Bar, or by entering appropriate data. By pressing the F3 key, you return to "Offline Setup" panel.

6. Press the F3 key to exit for starting the display station operation.

You have now completed the setup panel operation for the "Customization" panel.

Serial Number

When manufactured, the machine serial number is stored in memory. It is used by the communication controllers for detecting and logging errors with NetView[4]. When you need to change the serial number due to replacement of the logic element, or if the serial number was re-initialized because of a machine failure, you can set or change it by performing the following actions (see page 5-40 for serial-number location).

If a host session is in process (working with the host application program), you need to complete the session before going into the "Customization" panel.

The following steps show the procedure that you need to follow for setting the serial number.

1. When the display station is operational, press the SetUp key while holding down the Shift (Alt for the 104/122/124-key keyboard) key.

104/122/124-key keyboard   IBM Enhanced keyboard

You will see the "Online Setup" panel.

```
                        Online Setup

Move cursor to desired selection and press ENTER.
```
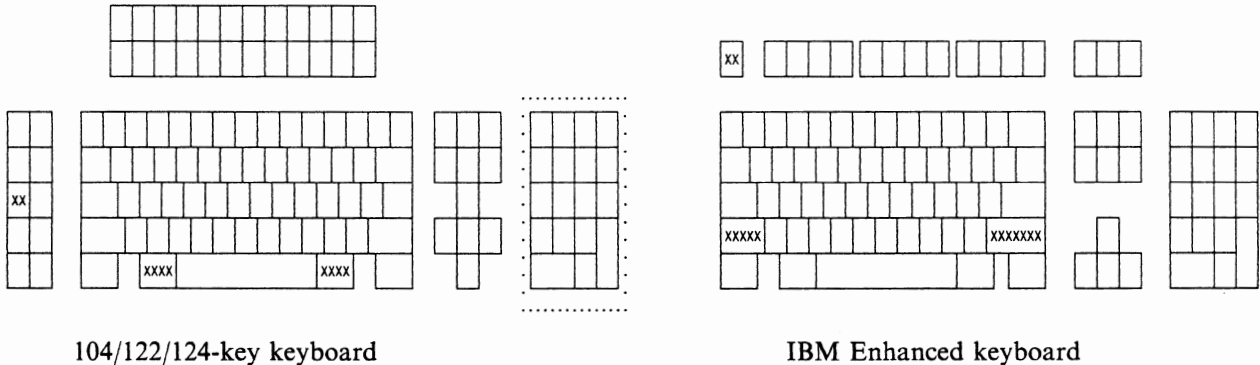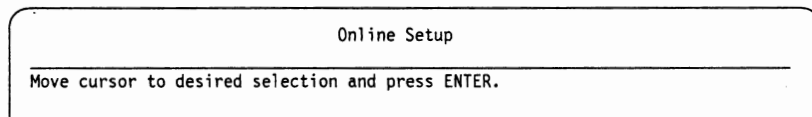
Note: When "Subsystem" is selected for "Model/Type" in "Customization" panel, "Setup printer" does not appear.

---

4 NetView is a trademark of International Business Machines Corporation.

2. Select "Go to offline setup" by using the cursor move keys and by pressing the Enter key. You should see the following warning message for host session disconnection: "Sessions will be terminated, press Enter to continue or any other key to quit.".

```
                          Online Setup

Move cursor to desired selection and press ENTER.

  Setup display

  Setup printer

  Setup window

  Go to offline setup




F3=Exit

SETUP
```

3. Press the Enter key to continue. The "Offline Setup" panel should appear.

```
                          Offline Setup

Move cursor to desired selection and press ENTER.
```

4. Select "Update serial number" by using the cursor move keys and by pressing the Enter key.

```
┌─────────────────────────────────────────────────────────────────────┐
│                          Offline Setup                              │
│ ─────────────────────────────────────────────────────────────────── │
│ Move cursor to desired selection and press ENTER.                   │
│                                                                     │
│    Customize display station                                        │
│                                                                     │
│   ▐Update serial number▌                                            │
│                                                                     │
│    Set extended vital product data                                  │
│                                                                     │
│    Test display station                                             │
│                                                                     │
│    Change keyboard layout                                           │
│                                                                     │
│    Customize display controller                                     │
│                                                                     │
│                                                                     │
│                                                                     │
│  F3=Exit                                                            │
│ ─────────────────────────────────────────────────────────────────── │
│  SETUP                                                              │
└─────────────────────────────────────────────────────────────────────┘
```

Note: "Set extended vital product data" will appear dependant on the control unit support.

The "Serial Number" panel should appear.

```
┌─────────────────────────────────────────────────────────────────────┐
│                          Serial Number                              │
│ ─────────────────────────────────────────────────────────────────── │
│ Move cursor to desired field.  Type the requested information.      │
│                                                                     │
│                                                                     │
│     Machine serial . . . . . . .  ▌ - ____     A-Z  0-9             │
│                                                                     │
│                                                                     │
│                                                                     │
│                                                                     │
│                                                                     │
│                                                                     │
│                                                                     │
│                                                                     │
│  F3=Exit                                              F12=Cancel    │
│ ─────────────────────────────────────────────────────────────────── │
│  SETUP                                                              │
└─────────────────────────────────────────────────────────────────────┘
```

Note: If you are reentering the IBM machine serial number, insert "00" in the third and forth digits. For example, the IBM machine serial number "1234567" should be entered as "120034567". The first two digits indicate the plant of manufacture and the last five digits show the actual machine serial number. The following figure shows the relation between serial number on the label and panel.

```
┌── Relation between serial number on the label and panel ──────────────────┐
│                                                                            │
│  Serial number on the label   │ TYPE 3472 S/N XX-XXXXX │                   │
│                                │              12 34567  │                   │
│                                └────────────────────────┘                   │
│                                                                            │
│                                                                            │
│  Machine serial on the        │ MACHINE SERIAL ..... X X 0 0 X X X X │      │
│  serial number panel          │                      1 2     3 4 5 6 7 │   │
│                                └──────────────────────────────────────┘     │
│                                                                            │
└────────────────────────────────────────────────────────────────────────────┘
```

5. Enter the appropriate data and return to "Offline Setup" panel by pressing the F3 key.

6. Press the F3 key to exit for starting the display station operation.

You have now completed the setup panel operation for the "Serial Number" panel.

Extended Vital Product Data

You can define data for network asset management (NetView[5]). When the logic element is replaced, the extended vital product data has to be re-entered.

Note: "Extended vital product data" will be available dependant on the control unit support.

If a host session is in process (working with the host application program), you need to complete the session before going into the "Customization" panel.

The following steps show the procedure that you need to follow for setting the extended vital product data.

1. When the display station is operational, press the **SetUp** key while holding down the **Shift** (Alt for the 104/122/124-key keyboard) key.

104/122/124-key keyboard   IBM Enhanced keyboard

You will see the "Online Setup" panel.

```
┌────────────────────────────────────────────────────────────────┐
│                          Online Setup                          │
│ ────────────────────────────────────────────────────────────── │
│ Move cursor to desired selection and press ENTER.              │
│                                                                │
└────────────────────────────────────────────────────────────────┘
```
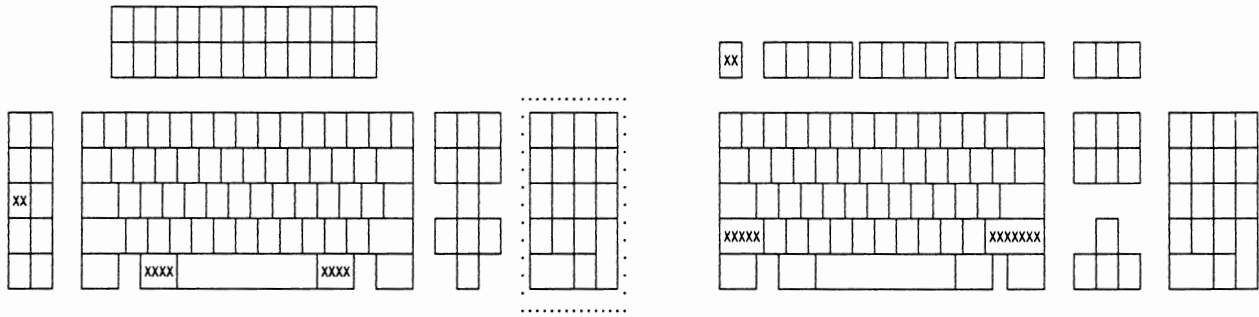
Note: When "Subsystem" is selected for "Model/Type" in "Customization" panel, "Setup printer" does not appear.

---

5 NetView is a trademark of International Business Machines Corporation.

2. Select "Go to offline setup" by using the cursor move keys and by pressing the Enter key. You should see the following warning message for host session disconnection: "Sessions will be terminated, press Enter to continue or any other key to quit.".

```
                              Online Setup

Move cursor to desired selection and press ENTER.

  Setup display

  Setup printer

  Setup window

  Go to offline setup



F3=Exit

SETUP
```

3. Press the Enter key to continue. The "Offline Setup" panel should appear.

```
                              Offline Setup

Move cursor to desired selection and press ENTER.
```

4. Select "Set extended vital product data" by using the cursor move keys and by pressing the Enter key.

```
┌─────────────────────────────────────────────────────────────────────┐
│                            Offline Setup                              │
│                                                                       │
│ Move cursor to desired selection and press ENTER.                     │
│                                                                       │
│   Customize display station                                          │
│                                                                       │
│   Update serial number                                               │
│                                                                       │
│   ▓Set extended vital product data▓                                  │
│                                                                       │
│   Test display station                                               │
│                                                                       │
│   Change keyboard layout                                             │
│                                                                       │
│   Customize display controller                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│ F3=Exit                                                               │
│                                                                       │
│ SETUP                                                                 │
└─────────────────────────────────────────────────────────────────────┘
```

The "Extended Vital Product Data" panel should appear.

```
┌─────────────────────────────────────────────────────────────────────┐
│                      Extended Vital Product Data                      │
│                                                                       │
│ Move cursor to desired field.  Type the requested information.        │
│                                                                       │
│     Label                        Data                                 │
│                                                                       │
│     1. NAME                        *  █                               │
│     2. DEPARTMENT                  *  _____        │
│     3.                             *  _____        │
│     4.                             *  _____        │
│     5.                             *  _____        │
│     6.                             *  _____        │
│     7.                             *  _____        │
│     8.                             *  _____        │
│                                                                       │
│                A-Z a-z 0-9 Space +<=>%&*"'(),_-./:;?                   │
│                                                                       │
│                                                                       │
│                                                                       │
│ F3=Exit                                              F12=Cancel       │
│                                                                       │
│ SETUP                                                                 │
└─────────────────────────────────────────────────────────────────────┘
```

Note: The labels that appear on the panel are defined in the control unit customization.

5. Enter the appropriate data and return to "Offline Setup" panel by pressing the F3 key.

6. Press the F3 key to exit for starting the display station operation.

You have now completed the setup panel operation for the "Extended Vital Product Data" panel.

Display Setup

You can change the items in the "Display Setup" panel without detaching the host session (job with the host application program).

The following steps show the procedure that you need to follow for setting the display station characteristics.

1. When the display station is operational, press the SetUp key while holding down the Shift (Alt for the 104/122/124-key keyboard) key.

104/122/124-key keyboard   IBM Enhanced keyboard

You will see the "Online Setup" panel.

```
Online Setup

Move cursor to desired selection and press ENTER.
```
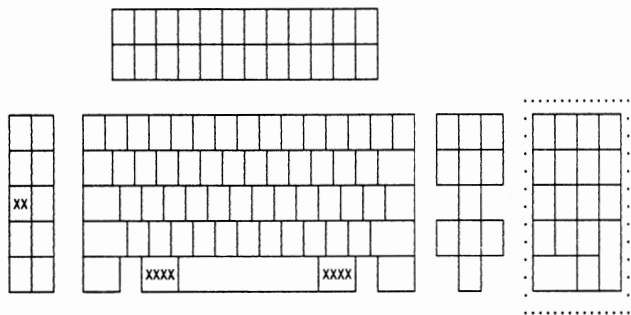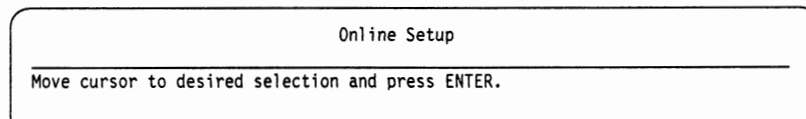
Note: When "Subsystem" is selected for "Model/Type" in "Customization" panel, "Setup printer" does not appear.

2. Select "Setup display" by using the cursor move keys and by pressing the Enter key.

```
┌─────────────────────────────────────────────────────────────────────┐
│                            Online Setup                               │
│ ───────────────────────────────────────────────────────────────────  │
│ Move cursor to desired selection and press ENTER.                     │
│                                                                       │
│  Setup display                                                        │
│                                                                       │
│  Setup printer                                                        │
│                                                                       │
│  Setup window                                                         │
│                                                                       │
│  Go to offline setup                                                  │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│ F3=Exit                                                               │
│ ───────────────────────────────────────────────────────────────────  │
│ SETUP                                                                 │
└─────────────────────────────────────────────────────────────────────┘
```
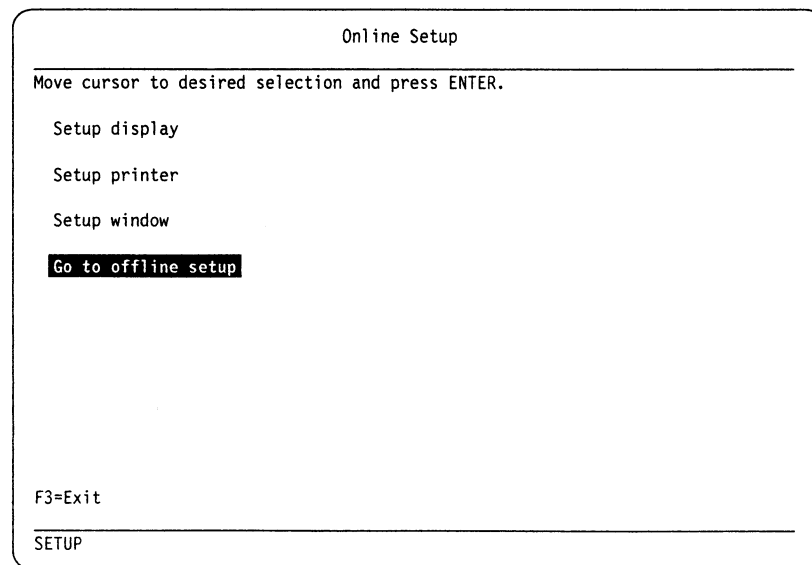
The "Display Setup" panel should appear.

```
┌─────────────────────────────────────────────────────────────────────┐
│                          Display Setup                    More:  +    │
│ ───────────────────────────────────────────────────────────────────  │
│ Move cursor to desired field.  Type the requested information or      │
│ press SPACE BAR to select choice.                                     │
│                                                                       │
│   Screen rows x columns  . . .  24 x 80   32 x 80   43 x 80  27 x 132 │
│                                                                       │
│   Auto dim . . . . . . . . . .  Yes       No                          │
│     Delay  (minutes) . . . . .  5         10        20                │
│                                                                       │
│   Scroll start . . . . . . . .  0_        0-10 characters             │
│                                                                       │
│   Mono case  . . . . . . . . .  Yes       No                          │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│ F3=Exit                  F8=Forward                                   │
│ ───────────────────────────────────────────────────────────────────  │
│ SETUP                                                                 │
└─────────────────────────────────────────────────────────────────────┘
```

Notes:

a. When you change the "Screen rows x columns", it is recommended to adjust "Session rows x columns".

b. You need to select "24 x 80" or "32 x 80" for the "Screen rows x columns", if you use the graphic session.

You have a maximum of three selection panels: the panel above and the following two. Use the F8 key to move to the next panel and the F7 key for the previous panel.

```
                         Display Setup                    More: -+

Move cursor to desired choice. then press SPACE BAR to select.

    Rule line
       Style  . . . . . . . . . .   Horizontal    Vertical      Cross
       Color  . . . . . . . . . .   White         Green
       Follows cursor . . . . . .   Yes           No

    Alphanumeric cursor
       Style  . . . . . . . . . .   Underline     Block
       Blink  . . . . . . . . . .   Yes           No

    Graphics cursor
       Style  . . . . . . . . . .   Cross         Cross-hair
       Blink  . . . . . . . . . .   Yes           No
       Color  . . . . . . . . . .   White         Green

    Row/column indicator . . . .    On            Off


  F3=Exit     F7=Backward      F8=Forward

  SETUP
```

```
                         Display Setup                    More: -

Move cursor to desired choice, then press SPACE BAR to select.

    Typematic
       Rate . . . . . . . . . . .   Normal        Fast

       Delay  . . . . . . . . . .   Short         Normal        Long

    Clicker
       Click  . . . . . . . . . .   Yes           No

       Volume . . . . . . . . . .   Off           1             2
                                    3             4             High

    Alarm volume . . . . . . . .    Off           1             2
                                    3             4             High




  F3=Exit     F7=Backward

  SETUP
```

3. Complete your selection by using the cursor move keys and by pressing the
   Space Bar. By pressing the F3 key, you return to "Online Setup" panel.

4. Press the F3 key to exit to normal display station operation.

You have now completed the setup panel operation for the "Display Setup" panel.

Test Display Station (Record/Play Options)

IMPORTANT: Once the function is changed, the original record/play function can not be resumed without IBM service representative's support.

You can change the record/play function to prohibit the non-display field input (like a password input), or the record/play function can be totally disabled.

If a host session is in process (working with the host application program), you need to complete the session before going into the "Customization" panel.

The following steps show the procedure that you need to follow for changing the record/play options.

1. When the display station is operational, press the SetUp key while holding down the Shift (Alt for the 104/122/124-key keyboard) key.

104/122/124-key keyboard   IBM Enhanced keyboard

You will see the "Online Setup" panel.

```
                          Online Setup
_____
Move cursor to desired selection and press ENTER.
```

2. Select "Go to offline setup" by using the cursor move keys and by pressing the
   Enter key. You should see the following warning message for host session dis-
   connection: "Sessions will be terminated, press Enter to continue or any other
   key to quit.".

```
                             Online Setup
 _____
 Move cursor to desired selection and press ENTER.

    Setup display

    Setup printer

    Setup window

    █Go to offline setup█




 F3=Exit
 _____
 SETUP
```

3. Press the Enter key to continue. The "Offline Setup" panel should appear.

```
                             Offline Setup
 _____
 Move cursor to desired selection and press ENTER.
```

4. Select "Test display station" by using the cursor move keys and by pressing the Enter key.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                           Offline Setup                                   │
│ ───────────────────────────────────────────────────────────────────────│
│ Move cursor to desired selection and press ENTER.                         │
│                                                                           │
│   Customize display station                                              │
│                                                                           │
│   Update serial number                                                   │
│                                                                           │
│   Set extended vital product data                                        │
│                                                                           │
│   ▌Test display station▐                                                 │
│                                                                           │
│   Change keyboard layout                                                 │
│                                                                           │
│   Customize display controller                                          │
│                                                                           │
│                                                                           │
│                                                                           │
│ F3=Exit                                                                   │
│ ─────────────────────────────────────────────────────────────────────── │
│ SETUP                                                                     │
└─────────────────────────────────────────────────────────────────────────┘
```

You will see the following panel.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                                                                           │
│      3472                        0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ      │
│                                                                           │
│      AA0012345                                                            │
│                                                                           │
│      0151  09F4600   09F4602   AAAAAAAA    AAAAAAAA    AAAAAAAA            │
│                                                                           │
│            09F4601   09F4603   AAAAAAAA    AAAAAAAA    AAAAAAAA            │
│                                                                           │
│      10111111 10111111         AAAAAAAA    AAAAAAAA    AAAAAAAA            │
│                                                                           │
│      _                         ████████    ████████    ████████           │
│                                                                           │
│                                                                           │
│                                                                           │
│                                                                           │
│ Reset=Exit                                                                │
│ ─────────────────────────────────────────────────────────────────────── │
│ TEST                                                                      │
└─────────────────────────────────────────────────────────────────────────┘
```

5. Press and hold down the Alt and Shift keys, and then press the Record key. You should see one of the following symbols appear in the operator information area.

R0	The full (original) Record/Play function is available.
R1	Non-display field input is prohibited.
R2	The record/play function is disabled.

Note: Once an **Rn** number is increased, it cannot be decreased; as changing from **R1** to **R0**.

- If you wish to prohibit the non-display field input, press the F1 key. The blinking R1 should appear.

  - To cancel the change, press the Reset key.
  - To accept the change, press the Enter key. The blinking R1 changes to **R1**. After a few seconds, **R1** disappears.

- If you wish to disable the record/play function, press the F2 key. The blinking R2 should appear.
    - To cancel the change, press the Reset key.
    - To accept the change, press the Enter key. The blinking R2 changes to **R2** . After a few seconds, **R2** disappears.

6. Press the Reset key to exit to normal display station operation.

You have now completed the setup panel operation for the "Test Display Station" panel.

Customize Display Controller

If a host session is in process (working with the host application program), you have to complete the session before going into the "Customization" panel.

The following steps show the procedure that you need to follow for customizing the display controller (control unit).
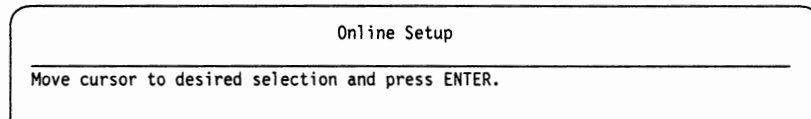
1. When the display station is operational, press the SetUp key while holding down the Shift (Alt for the 104/122/124-key keyboard) key.

104/122/124-key keyboard   IBM Enhanced keyboard

You will see the "Online Setup" panel.

```
                              Online Setup
───────────────────────────────────────────────────────────────────
Move cursor to desired selection and press ENTER.
```

2. Select "Go to offline setup" by using the cursor move keys and by pressing the Enter key. You should see the following warning message for host session disconnection: "Sessions will be terminated, press Enter to continue or any other key to quit.".

```
                              Online Setup
───────────────────────────────────────────────────────────────────
Move cursor to desired selection and press ENTER.

    Setup display

    Setup printer

    Setup window

    Go to offline setup




F3=Exit
───────────────────────────────────────────────────────────────────
SETUP
```

3. Press the Enter key to continue. The "Offline Setup" panel should appear.

```
                        Offline Setup
_____
Move cursor to desired selection and press ENTER.
```

4. Select "Customizing display controller" by using the cursor move keys and by pressing the Enter key.

```
                        Offline Setup
_____
Move cursor to desired selection and press ENTER.

   Customize display station

   Update serial number

   Set extended vital product data

   Test display station

   Change keyboard layout

   Customize display controller


F3=Exit
_____
SETUP
```

Note: "Set extended vital product data" will appear dependant on the control unit support.

The display station is ready to use for customizing the control unit. Refer to *IBM 3174 Subsystem Control Unit Customizing Guide* for further operation.

After the control unit customization, you need to power off and on the display station to start normal display station operation.

Printer Setup

You can change the items in the "Printer Setup" panel without detaching the host session (job with the host application program).

The following steps show the procedure that you need to follow for printer setup operation.

1. When the display station is operational, press the SetUp key while holding down the Shift (Alt for the 104/122/124-key keyboard) key.

104/122/124-key keyboard   IBM Enhanced keyboard

You will see the "Online Setup" panel.

```
┌─────────────────────────────────────────────────────────────────┐
│                          Online Setup                            │
│─────────────────────────────────────────────────────────────────│
│ Move cursor to desired selection and press ENTER.                │
│                                                                  │
└─────────────────────────────────────────────────────────────────┘
```
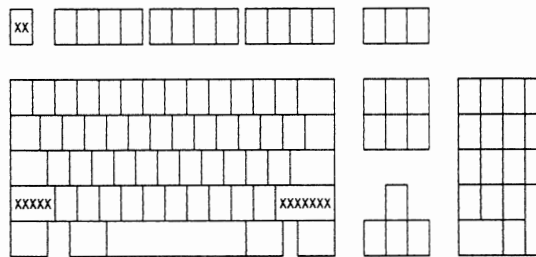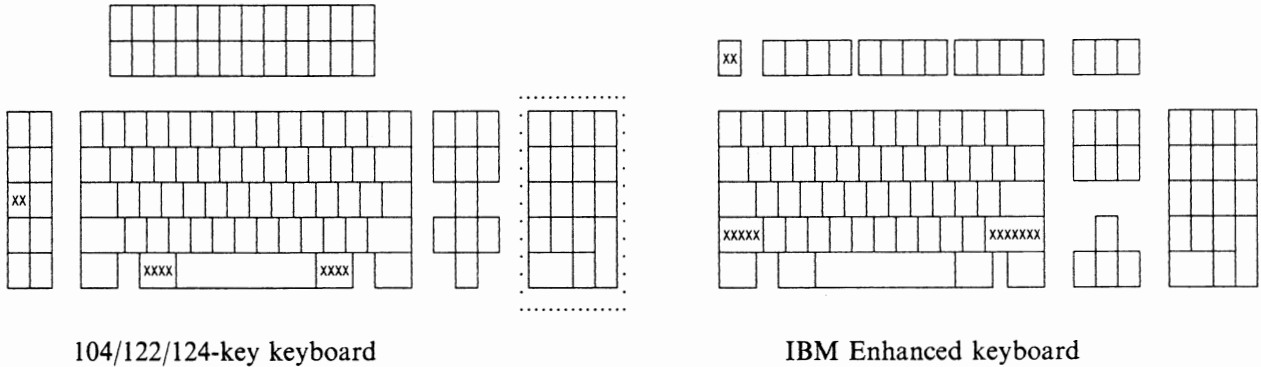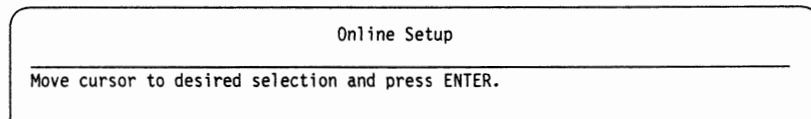
Note: When "Subsystem" is selected for "Model/Type" in "Customization" panel, "Setup printer" does not appear.

2. Select "Setup printer" by using the cursor move keys and by pressing the Enter key.

```
┌─────────────────────────────────────────────────────────────┐
│                      Online Setup                           │
│ ─────────────────────────────────────────────────────────── │
│ Move cursor to desired selection and press ENTER.           │
│                                                             │
│   Setup display                                             │
│                                                             │
│   ▌Setup printer▐                                           │
│                                                             │
│   Setup window                                              │
│                                                             │
│   Go to offline setup                                       │
│                                                             │
│                                                             │
│                                                             │
│                                                             │
│                                                             │
│                                                             │
│ F3=Exit                                                     │
│ ─────────────────────────────────────────────────────────── │
│ SETUP                                                       │
└─────────────────────────────────────────────────────────────┘
```

The "Printer Setup" panel should appear.

```
┌─────────────────────────────────────────────────────────────┐
│                    Printer Setup              More:  +      │
│ ─────────────────────────────────────────────────────────── │
│ Move cursor to desired field.  Type the required information or │
│ press SPACE BAR to select choice.                           │
│                                                             │
│   Characters per inch  . . . .  ▌10▐     12      17.1       │
│   Lines per inch . . . . . . .  3        4       6       8  │
│                                                             │
│   Paper height (inches)  . . .  8.5      11      12     Other │
│   Paper width (inches) . . . .  8        13.5              │
│                                                             │
│   Lines per page . . . . . . .  066    001-127            │
│   Top margin . . . . . . . . .  0      000-65    Paper │0  │
│   Bottom margin  . . . . . . .  0      000-65          ┌────┐ │
│   Left margin  . . . . . . . .  0      000-79    0 │Print│066 │066
│                                                    │Area │    │
│                                                          │0  │
│                                                   ├───080───┤ │
│                                                             │
│ F3=Exit                 F8=Forward                          │
│ ─────────────────────────────────────────────────────────── │
│ SETUP                                                       │
└─────────────────────────────────────────────────────────────┘
```

Notes:

a. "Paper width" appears only for printers: IBM 4202, 4208, 5202, and 5204.

b. "Lines per page" appears when "Other" is selected for "Paper height".

c. "Lines per page" is automatically calculated from "Lines per inch" and "Paper height" unless "Other" is selected for "Paper height".

d. A number of maximum printable characters is automatically calculated from "Characters per inch" and "Paper width".

You have a maximum of three selection panels: the panel above and the following two. Use the F8 key to move to the next panel and the F7 key for the previous panel.

```
/                                                              \
|                        Printer Setup                More: -+ |
|                                                              |
| Move cursor to desired choice, then press SPACE BAR to select.|
|                                                              |
|    Print quality . . . . . . . [Draft]    Letter    Enhanced |
|                                                              |
|    Form feed after print . . .  Yes       No                 |
|                                                              |
|    Trim border . . . . . . . .  White     Green              |
|                                                              |
|    Graphics print . . . . . . . Yes       No       Auto      |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
|  F3=Exit     F7=Backward    F8=Forward                       |
| _____ |
|  SETUP                                                       |
\                                                              /
```

Notes:

a. When "4207" or "4208" is selected for "Model/Type" of "Printer", "Enhanced" does not appear.

b. The APL characters can be printed on the 4201 or 4202 printers in alphanumeric mode.

c. If you intend to print graphics, or the host loaded special characters (PSS), "Yes" or "Auto" should be selected for "Graphics print".

The following table shows the print quality in the panel and the equivalent print quality for each printer.

Print Quality	4201/4202	4207/4208	5202/5204
Draft	DP	DP	DP
Letter	NLQ	LQ	LQ
Enhanced	NLQ II	(not available)	ELQ

The printer can print the display contents using the character font set in the printer or with the complete image of the displayed data including graphics.

If you select "No" for "Graphics print", the displayed characters will be printed using the printer character font set. The printed characters may appear differently in shape from the displayed characters. The graphics and the program symbol sets will not be printed. The APL characters will be printed only on the printers that have the APL character font set.

If you select "Yes", the complete image of the displayed data will be printed. Printing image is slower than printing characters, but the printed data has the same appearance as the displayed data.

If "Auto" is selected, the printer character font set is used when the displayed data does not contain graphics, program symbol set, and APL characters. If the

displayed data contains these data, the printer automatically prints the complete image of the displayed data.

The following figure shows the "Code page" selection in setup mode, printer code page setting, and required printer options.

Printer	Code page: 437	Code page: 850	Printer: US	Printer: Multina-tional	850 Font Cartridge Required	Option RAM for 850 Required
4201-2	X					
4201-3[6]	X	X	X	X		X
4202-2	X					
4202-3[6]	X	X	X	X		X
4207				X		X
4208				X		X
5202					X	
5204					X	

The following graphics color mapping applies only to the graphics printing only.

```
                          Printer Setup                    More: -

Move cursor to desired choice, then press SPACE BAR to select.

  Graphics color mapping

      Background . . . . . . . .   On      Off

      Red  . . . . . . . . . . .   On      Off

      Pink . . . . . . . . . . .   On      Off

      Green  . . . . . . . . . .   On      Off

      Yellow . . . . . . . . . .   On      Off

      Blue . . . . . . . . . . .   On      Off

      Turquoise  . . . . . . . .   On      Off

      White  . . . . . . . . . .   On      Off

F3=Exit     F7=Backward

SETUP
```

3. Complete your selection by using the cursor move keys and by pressing the Space Bar and by entering the appropriate data. By pressing the F3 key, you return to the "Online Setup" panel.
4. Press the F3 key to exit to normal display station operation.

You have now completed the setup panel operation for the "Printer Setup" panel.

---

[6] If the "Code page" is set to "437", set the printer code page to "US". If the "Code page" is set to "850", set the printer code page to "Multinational".

Printer Control

When you select the local printer (other than the "Subsystem" printer in the "Customization" panel) and press the Print key, "PRINT" appears in the operator information area and the display station is placed in print mode. If you press the F14 key in this mode, you will see the "Printer Control" panel.

```
                              Printer Control
─────────────────────────────────────────────────────────────────────
Move cursor to desired selection and press ENTER.


  Paper Control

    Line feed

    Form feed

  Printer Session Control

    Cancel print

    PA1

    PA2


F3=Exit
─────────────────────────────────────────────────────────────────────
PRINT CTRL        ▭▬▭
```

Notes:

1. The "Printer Control" panel appears only when the "Printer session" is assigned to one of the host sessions in the "Customization" panel.

2. "PA1" and "PA2" appear only for LU1.

In this screen, you can:

- advance a line or a page of the paper
- cancel a print job from the host system
- send a PA1 or PA2 signal to the host system (depending on the communication method).

Press the F3 key to return to print mode. To exit from the print control panel or print mode, press the Print key.

Printer Session Options

When the local printer model (other than "Subsystem") is selected for "Model/Type" of "Printer" in the "Customization" panel, you can assign a printer session to one of the host sessions and perform a host addressable printing.

The printer session options are valid only for the printer-LT (logical terminal). Refer to *IBM 3274 Control Unit Description and Programmer's Guide* or *IBM 3174 Subsystem Control Unit Functional Description* for details of the printer-LT.

Print Controls

The following print controls can be redefined for the host addressable printing of SNA LU3 and non-SNA.

Automatic New Line: When the print data exceeds the maximum print position, the exceeded data is automatically printed on the next line. In the following figure, the exceeded print data "AAAAAAAA" is printed on the next line.

```
(Print Data)
|........1.........2.........3.........4.........5.........6.........7.........|
000000000000000000000000000000000000000000000000000000000000000000000000000000AAAAAAAA


(Print Output)
|........1.........2.........3.........4.........5.........6.........7.........|
000000000000000000000000000000000000000000000000000000000000000000000000000000
AAAAAAAA
```

Figure   A-1. Automatic New Line

Form Feed (FF): When the printer encounters the form feed (FF) character, a page ejection occurs and the subsequent print data is printed on the next page.

Carriage Return (CR): When the printer encounters the carriage return (CR) character, the print position is moved to the left margin of the current line. The subsequent data is printed on the left margin of the current line.

New Line (NL): When the printer encounters the new line (NL) character, the print position is moved to the left margin on the next line. The subsequent print data is printed on the left margin of the next line.

Suppress Nulls

The print data line that contains only non-printable characters can be suppressed or printed as a blank line. This selection is valid only for formatted mode print in host addressable printing. The initial setting of this value is "Yes" (suppressed).

Suppress Automatic New Line when CR at Maximum Print Position + 1

The automatic new line can be suppressed when a carriage return character appears next to the maximum print position. The following figure shows that "Yes" is selected. The automatic new line is suppressed when a carriage return character appears next to the maximum print position; "X" overrides the first "O".

```
(Print Data)
|........1.........2.........3.........4.........5.........6.........7.........|
0000000000000000000000000000000000000000000000000000000000000000000000000000*X

* Carriage Return

(Print Output)
|........1.........2.........3.........4.........5.........6.........7.........|
▨0000000000000000000000000000000000000000000000000000000000000000000000000000
```

Figure   A-2. Automatic New Line Suppressed (CR at MPP + 1)

The following figure shows that "No" is selected. The automatic new line is not suppressed and "X" is printed at the first position of the next line.

```
(Print Data)
|........1.........2.........3.........4.........5.........6.........7.........|
0000000000000000000000000000000000000000000000000000000000000000000000000000*X

* Carriage Return

(Print Output)
|........1.........2.........3.........4.........5.........6.........7.........|
0000000000000000000000000000000000000000000000000000000000000000000000000000
X
```

Figure   A-3. Automatic New Line Not Suppressed (CR at MPP + 1)

This selection is valid only for unformatted mode print in host addressable printing. The initial setting of this value is "No" (not suppressed).

Suppress Automatic New Line when FF at Print End

The automatic new line can be suppressed when the FF is at the end of print data or immediately followed by the valid end-message (EM). This selection is not valid when "Yes" is selected for "FF at End of Print". The initial setting of this value is "No" (not suppressed).

Suppress Automatic New Line when NL at Maximum Print Position + 1

The automatic new line can be suppressed when a new line character appears next to the maximum print position. The following figure shows that "Yes" is selected. The automatic new line is suppressed when a new line character appears next to the maximum print position; "X" appears at the left margin of the next line.

```
(Print Data)
|........1.........2.........3.........4.........5.........6.........7.........|
0000000000000000000000000000000000000000000000000000000000000000000000000000*X

* New Line

(Print Output)
|........1.........2.........3.........4.........5.........6.........7.........|
0000000000000000000000000000000000000000000000000000000000000000000000000000
X
```

Figure   A-4. Automatic New Line Suppressed (NL at MPP + 1)

The following figure shows that "No" is selected. The automatic new line is not suppressed; "X" is printed at the left margin of the line after next.

```
(Print Data)
|........1.........2.........3.........4.........5.........6.........7.........|
000000000000000000000000000000000000000000000000000000000000000000000000000000*X

* New Line

(Print Output)
|........1.........2.........3.........4.........5.........6.........7.........|
0000000000000000000000000000000000000000000000000000000000000000000000000000000

X
```

Figure   A-5. Automatic New Line Not Suppressed (NL at MPP + 1)

This selection is valid only for unformatted mode print in host addressable printing.
The initial setting of this value is "No" (not suppressed).

FF Ignored when not in First Print Position

The form feed character can be ignored. When "Yes" is selected, a form feed char-
acter at the first position, or next to the maximum print position in a print data line,
is executed. Form feed characters in other positions are printed as blank characters.
When "No" is selected, all form feeds are executed. The initial setting of this value
is "No" (all form feeds executed).

FF Takes Position if Followed by Data

When "Yes" is selected, and the form feed character is not at the end of the print
data, a form feed is executed and a blank character is printed at the left margin of
the next page. Subsequent print data starts at the top left margin on the next page.
When "No" is selected, the form feed character is not printed as a blank character
and the subsequent print starts from the left margin on the next page. The initial
setting of this value is "Yes" (FF printed as a blank).

FF at End of Print

When "Yes" is selected, a form feed occurs at print end. The subsequent print
starts from the left margin in the top margin on the next page. When "No" is
selected, an automatic new line is not executed at print end. The initial setting of
this value is "No" (no form feed).

Appendix B. Programming Considerations

The display station is, from a host application point of view, functionally compatible with the IBM 3279, 3179-G, and 3192-G display stations. However, you may need to consider the following items when your host application program is developed.

GDDM Support

GDDM support for this terminal is similar to that previously given for the display station. Support is provided under Version 2 Release 2 of the following:

- GDDM/VM, program number 5664-200
- GDDM/MVS, program number 5665-356
- GDDM/VSE, program number 5666-328
- GDDM/VMXA, program number 5684-007.

Data Stream Functions for Display-LT

This chapter describes the 3270 data stream functions supported by the display station. For general information on all the 3270 data-stream functions, refer to the *IBM 3270 Information Display System Data Stream Programmer's Reference*, GA23-0059.

Attributes

The display station supports field attributes, extended field attributes, and character attributes.

Field Attributes

The following figure shows the field attribute byte and bit assignments for the field attributes supported by the display station.

Table B-1 (Page 1 of 2). Field Attribute Character Bit Assignment	
EBCDIC Bit	**Field Description**
0, 1	Value determined by contents of bits 2-7.
2	**0 =** Unprotected **1 =** Protected
3	**0 =** Alphameric **1 =** Numeric **Note:** Bits 2 and 3 being set to 1 cause an automatic skip.
4, 5	**00 =** Display/not cursor-select-key detectable. **01 =** Display/cursor-select-key detectable. **10 =** Intensified display/cursor-select-key detectable. **11 =** Nondisplay, nonprint, nondetectable.
6	Reserved.

Table B-1 (Page 2 of 2). Field Attribute Character Bit Assignment	
EBCDIC Bit	**Field Description**
7	Modified Data Tag (MDT); identifies modified fields during Read Modified command operations.
	0 = Field has not been modified.
	1 = Field has been modified by the operator. Can also be set by program in data stream.

Extended Field Attributes

The following attribute types and attribute values are used in the Start Field Extended (SFE), Modify Field (MF) and Set Attribute (SA) orders. These orders are supported by the display station. All other attribute types and values are rejected with a negative response (in SNA) or an Op-Check (in non-SNA).

Attribute Type	Code	SFE, MF Orders	SA Orders
Character Attribute reset	X'00'	-	x
Field Attribute	X'C0'	x	-
Extended Highlighting	X'41'	x	x
Color	X'42'	x	x
Programmed Symbols	X'43'	x	x
Background Transparency	X'46'	x	x

The x indicates that the type code is valid when used in the order.

Valid attribute values and type codes are as follows:

Type	Value	Result
X'00'	X'00'	This is the only valid setting for this attribute type. All character attributes that can be specified in SA order are set to default value.
X'C0'		The codes appearing here have the same format as that of the field attribute codes preceded by the SF order.
X'41'	X'00'	Default (Normal)
	X'F1'	Blink
	X'F2'	Reverse Video
	X'F4'	Underline
X'42'	X'00'	Default (Green)
	X'F1'	Blue
	X'F2'	Red
	X'F3'	Pink
	X'F4'	Green
	X'F5'	Turquoise
	X'F6'	Yellow
	X'F7'	White

Type	Value	Result
X'43'	X'00'	Default (Base character set)
	X'40' to X'EF' X'F1'	Valid range for symbol-set IDs in the Load Programmed Symbol Set structured field. Symbol-set ID for the Alternate Character Set (APL). This value is valid only in SA. This value in SFE or MF causes non-SNA Op-Check or SNA -R(1005).
X'46'	X'00'	Default (Transparent)
	X'FF'	Non-Transparent

3270 Alphanumeric Data Stream

The display station supports the following 3270 alphanumeric data stream for the display-LT.

3270 Data Stream Commands

For a description of the functions of the following commands, refer to the *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061 and *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218.

Command	Mnemonic	Hex Line Code
Write	WR	F1
Erase/Write	EW	F5
Erase/Write Alternate	EWA	7F
Erase All Unprotected	EAU	6F
Read Modified	RM	F6
Read Modified All	RMA	6E
Read Buffer	RB	F2
Write Structured Field	WSF	F3

3270 Data Stream Orders

The display station supports the following 3270 data stream orders. For the description of the functions of the following orders, refer to the *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061 and *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218.

Order	Mnemonic	Hex Line Code
Set Buffer Address	SBA	11
Start Field	SF	1D
Start Field Extended	SFE	29
Modify Field Attribute	MF	2C
Set Attribute	SA	28
Insert Cursor	IC	13
Graphic Escape	GE	08
Program Tab	PT	05
Repeat To Address	RA	3C
Erase Unprotected To Address	EUA	12

Outbound Structured Fields

The Write Structured Field (WSF) command (X'F3') is used by the host program to transmit the outbound structured fields to the display station. A single write structured field command can send one or more structured fields as shown below.

WSF Command (X'F3')	Structured Field 1	Structured Field 2	-------------	Structured Field n

The following figure shows the outbound structured field functions supported by the display station.

Function	ID Code Byte-2	ID Code Byte-3	ID Code Byte-4

Read Partition
  Query
  Query List
	01		
			02
			03

Erase/Reset	03		
Load Programmed Symbol Set	06		
Set Reply Mode	09		
Create Partition	0C		

Outbound 3270DS
  Write
  Erase/Write
  Erase/Write Alternate
  Erase All Unprotected
	40		
			F1
			F5
			7E
			6F

Destination/Origin	0F	02	
Object Data	0F	0F	
Object Picture	0F	10	
Object Control	0F	11	
OEM Data	0F	1F	

All other structured-field IDs are rejected with a negative response (SNA) or an Op-Check (non-SNA).

Inbound Structured Fields

The attention ID (AID) (X'88') is used by the display station to transmit the inbound structured fields to the host program. A single AID can send one or more structured fields as shown below.

AID X('88')	Structured Field 1	Structured Field 2		Structured Field n

The following figure shows the inbound structured field functions supported by the display station.

Function	ID Code Byte-2	ID Code Byte-3
Inbound 3270DS	80	
Query Reply	81	
Summary		80
Usable Area		81
Alphanumeric Partitions		84
Character Sets		85
Color		86
Highlighting		87
Reply Mode		88
OEM Auxiliary Device		8F
Storage Pools		96
Auxiliary Device		99
Implicit Partition		A6
Background Transparency		A8
Segment		B0
Procedure		B1
Line Type		B2
Port		B3
Graphic Color		B4
Graphic Symbol Set		B6
Null		FF
Destination/Origin	0F	02 ·
Object Data	0F	0F
OEM Data	0F	1F

Inbound 3270DS: The Inbound 3270DS structured field is used to send data from the alphanumeric presentation layer to flow together with the graphic data.

Byte	Content	Description
0-1	L	Length of structure
2	X'80'	INBOUND 3270DS
3	X'00'	Partition Identifier
4	AID	Attention Identifier
5-6	CURSOR	Alphanumeric Cursor Position
7-N	DATA	Orders and Data

Query Reply: In response to the Query or Query List from the host system, the display station responds with a series of structured fields which describe the device capabilities.

AID (X'88')	Query Reply 1	Query Reply 2		Query Reply n

Communication Architecture

One of the following protocols is used:

- SNA on an SDLC link or LCA channel
- SLHA channel
- BSC link

Refer to the *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061 and *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218 for more information on the protocols.

SNA Commands Supported

The following are the SNA Commands supported by the various display station subsystem.

Name	Category	Out-bound	Inbound
ACTPU	SC	X^3	
DACTPU	SC	X^3	
ACTLU	SC	X^3	
DACTLU	SC	X^3	
BIND	SC	X	
UNBIND	SC	X	X^3
CLEAR	SC	X	
SDT	SC	X	
CANCEL	DFC	X	X
BID	DFC	X	
CHASE	DFC	X	
SIGNAL	DFC	X	X^1
SHUTD	DFC	X	
SHUTC	DFC		X
LUSTAT	DFC		X
RTR	DFC		X^2
Data	FMD	X	X
NOTIFY	FMD		X^3
REQMS	FMD	X^3	
RECFMS	FMD		X^3
NMVT(ALERT)	FMD		X^3
NMVT(RTM)	FMD	X^3	X^3
NMVT(PSID)	FMD	X^3	X^3

Note: 'X' indicates a command supported by the subsystems.

Bind Parameters: The display station validates the BIND parameter according to the following figure. Any invalid setting of BIND parameters will cause -R(0821) to be returned. A BIND RU of less than 27 bytes will also be rejected with -R(0821).

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[1] Commands generated by the display-LT

[2] Commands generated by the printer-LT

[3] Indicates a command processed or generated by the 3174/3274 Control Unit and not by the display station

Byte	Bit	LU Type 1		LU Type 2		LU Type 3	
		C/S	Reject if	C/S	Reject if	C/S	Reject if
1		C	¬X'01'	C	¬X'01'	C	
2, 3		C	¬X'0303'	C	¬X'0303'	C	
4	0	NC		NC		NC	
4	1	C	B'1'	C	B'1'	C	
4	2, 3	C	B'00'	C	B'00'	C	
4	4, 5	NC		NC		NC	
4	6	C	B'1'	C	B'1'	C	
4	7	C	B'0'	C	B'0'	C	
5	0	NC		C	B'0'	NC	
5	1	NC		NC		NC	
5	2, 3	CS	B'00'	CS	B'00'	CS	B'00'
5	4, 5	NC		NC		NC	
5	6, 7	NC		NC		NC	
6	0	NC		NC		NC	
6	1	S		C	B'1'	C	
6	2	C	B'0'	C	B'0'	C	
6	3	C	B'0'	C	B'0'	C	
6	4	C	B'1'	C	B'1'	C	
6	5-7	NC		NC		NC	
7	0, 1	C	¬B'10'	C	B'10'	C	
7	2	C	B'1'	C	B'1'	C	
7	3	C	B'1'	C	B'1'	C	
7	4-6	NC		NC		NC	
7	7	NC		NC		NC	
8	0-1	NC		NC		NC	
8	2-7	S		S		S	
9	0-1	NC		NC		NC	
9	2-7	CS		CS		CS	
10		CS		CS	< 64	CS	
11		C		C		C	
12, 13		NC		NC		NC	
14		C	¬X'01'	C	¬X'02'	C	
15-19		NC		NC		NC	
20-23		NC		CS		CS	
24		NC		C		C	

Byte	Bit	LU Type 1		LU Type 2		LU Type 3	
		C/S	Reject if	C/S	Reject if	C/S	Reject if
25		NC		NC		Nc	
26		C	¬X'00'	C	¬X'00'	C	

Byte	Bit	Meaning	Note
1		BIND type and format	
2, 3		FM Profile / TS Profile	
4	0	Chaining use (Out)	
4	1	Request Mode selection (Out)	
4	2, 3	Chaining Response	
4	4, 5	(Reserved)	
4	6	Compression indicator (Out)	
4	7	Send EB indicator (Out)	
5	0	Chaining use (In)	
5	1	Request Mode selection (In)	
5	2, 3	Chaining Response	**B'01' or B'11'** Exception Response will be requested on the inbound normal flow request. **B'10'** Definite Response will be requested on the inbound normal flow request.
5	4, 5	(Reserved)	
5	6, 7	Compression/Send EB indicator	
6	0	(Reserved)	
6	1	FM Header usage	
6	2	Bracket usage	
6	3	Bracket Termination protocol	
6	4	Alternate Code selection	
6	5-7	(Reserved)	
7	0, 1	Normal Flow Send/Receive Mode	
7	2	Recovery responsibility	
7	3	Bracket First Speaker	
7	4-6	(Reserved)	

Byte	Bit	Meaning	Note
7	7	Contention resolution	
8	0-1		
8	2-7	Inbound Pacing Count	Inbound pacing protocol is exercised if non-zero.
9	0-1		
9	2-7	Outbound Pacing Count	Pacing bit is echoed on the normal flow response header if non-zero. The following formula must be met. • LU1: (MRU + 2 + 6 + 3) * PI < = BUFF • LU2, 3: (2 * PI - 1) * MRU < = 7680 • PI: Pacing count specified by byte 9 • MRU: Outbound maximum RU size specified by byte 11 • BUFF: Printer buffer size The following values are recommended to give the display station better performance for graphic data transmission. RU9 = 2 RU11 = X'C7' (1536 bytes)
10		Inbound Max RU size	X'MN' in RU10 denotes $M*(2**N)$ bytes. $M*(2**N) > = 64$ and $X'8' < = M < = X'F'$ must be met. Lesser of $M*(2**N)$ and 1024 will be used.
11		Outbound Max RU size	X'MN' in RU11 denotes $M*(2**N)$ bytes. $X'8' < = M < = X'F'$ See Byte 9 for more check.
12, 13		(Reserved)	
14		LU profile	
15-19		(Reserved)	
20-23		Screen size	**LU2** **LU3**
24		Screen size	**LU2** **LU3**
25		(Reserved)	

Byte	Bit	Meaning	Note
26		Cryptography	

Note:

LU2 If RU24 is X'00' or X'02', (then) RU20 through RU23 are not checked, but default row/column = alternate row/column = X'18'/X'50'.

If RU24 is X'03', (then) RU20 through RU23 are not checked, but the session is bound with default row/column = X'18'/X'50' and with alternate row/column which have been selected for the LT within the display/notepad session options panel during the display station customization. Since the Bind does not specify the device screen size, it is application's responsibility to determine the size from the implicit partition query reply.

If RU24 is X'7E',

(alphanumeric session) 1 < = RU20 < = X'2B' and RU21 = X'50', or 1 < = RU20 < = X'1B' and RU21 = X'84' must be met, and default row/column = alternate row/column = RU20/RU21.

(graphic session) 1 < = RU20 < = X'20' and RU21 = X'50' must be met, and default row/column = alternate row/column = RU20/RU21.

If RU24 is X'7F',

(alphanumeric session) 1 < = RU20 < = X'2B' and RU21 = X'50', and 1 < = RU20 < = X'1B' and RU21 = X'84' must be met, and 1 < = RU22 < = X'2B' and RU23 = X'50', and 1 < = RU22 < = X'1B' and RU23 = X'84' must be met, and default row/column = RU20/RU21, alternate row/column = RU22/RU23.

(graphic session) 1 < = RU20 < = X'20' and RU21 = X'50' must be met, and 1 < = RU22 < = X'20' and RU23 = X'50' must be met, and default row/column = RU20/RU21, alternate row/column = RU22/RU23.

If RU24 is other than the above value, BIND will be rejected.

LU3 If RU24 is X'00' or X'02', (then) RU20 through RU23 are not checked, but default row/column = alternate row/column = X'18'/X'50'.

If RU24 is X'01', (then) RU20 through RU23 are not checked, but default row/column = alternate row/column = X'0C'/'28'

If RU24 is X'7E', (then) 1 < = RU20 * RU21 < = BUFF must be met and default row/column = alternate row/column = RU20/RU21

If RU24 is X'7F', (then) 1 < = RU20 * RU21 < = BUFF and 1 < = RU22 * RU23 < = BUFF must be met and default row/column = RU20/RU21, alternate row/column = RU22/RU23

If RU24 is other than the above value, BIND will be rejected

Data Stream Functions for Printer-LT

This section describes the data stream function supported by the printer-LT. The printer-LT supports the following type of data streams:

- 3270 data stream for LU-3/non-SNA
- SCS data stream for LU-1.

For general information on all the data stream functions or LU types see the following :

- *IBM 3270 Information Display System Data Stream Programmer's Reference*, GA23-0059.
- *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061.
- *IBM 3287 Printer Model 1 and 2 Component Description*, GA27-3153.
- *IBM 3270 Information Display System Component Description*, GA27-2749.
- *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218.

3270 Alphanumeric Data Stream

The display station supports the following 3270 alphanumeric data stream for the printer-LT.

3270 Data Stream Commands

The printer-LT supports the following commands:

Attribute Type	Mnemonic	Code
Write	WR	X'F1'
Erase/Write	EW	X'F5'
Erase/Write Alternate	EWA	X'7F'
Erase All Unprotected	EAU	X'6F'
Read Modified	RM	X'F6'[4]
Read Modified All	RMA	X'6E'[5]
Read Buffer	RB	X'F2'[5]
Write Structured Field	WSF	X'F3'

For the description of the function of each command, refer to *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061 and *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218.

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[4] For LU-3 printers, Read Modified command is supported only for retry of the query.

[5] For LU-3 printers, the Read Modified All and the Read Buffer commands are rejected.

Write Control Character (WCC)

The Write Control Character (WCC) bits have the following significance for the printer-LT.

Bit	Description
0	No function
1	No function for WR command. Reset function if set to 1, for EW and EWA commands.
2,3	Defines printout format as follows: **00 -** The NL or CR orders in data stream determine print line length, and EM designates the end of the message. Provided a print line when orders are not present. **01 -** specifies 40-character print line. **10 -** specifies 64-character print line. **11 -** specifies 80-character print line.
4	Start Print. When set to 1, initiates a printout operation at the completion of the write operation.
5	Sound-alarm bit. When set to 1, sounds the audible alarm if an audible alarm is provided.
6	Keyboard-restore bit.
7	Reset MDT bit.

3270 Data Stream Orders

The printer-LT supports the following orders:

Order	Mnemonic	Code
Set Buffer Address	SBA	X'11'
Start Field	SF	X'1D'
Start Field Extended	SFE	X'29'
Modify Field Attribute	MF	X'2C'
Set Attribute	SA	X'28'
Insert Cursor	IC	X'13'
Graphic Escape	GE	X'08'
Program Tab	PT	X'05'
Repeat To Address	RA	X'3C'
Erase Unprotected To Address	EUA	X'12'

For the description of the function of each order, refer to *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061 and *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218.

Format Control Orders

The printer-LT supports the following format control orders:

Format Control Orders	Mnemonic	Code
New Line	NL	X'15'
Carriage Return	CR	X'0D'
End of Message	EM	X'19'
Form Feed	FF	X'0C'

Outbound Structured Field

The Write Structured Field (WSF) command (X'F3') is used by the host program to transmit the outbound structured fields to the printer-LT. The following figure shows the outbound structured field functions supported by the printer-LT.

Structured field name	ID
Read Partition	X'01'
Erase/Reset	X'03'
Set Reply Mode	X'09'
Outbound 3270DS	X'40'

All other structured fields are rejected with a negative response (SNA) or an Op-Check (non-SNA).

Inbound Structured Field

The Attention ID (AID, X'88') is used by the printer-LT to transmit the inbound query reply structured fields to the host program. A single AID can send one or more structured fields.

The following shows the inbound query reply structured fields supported by the printer-LT.

Name of Query Replies	ID
Summary	X'80'
Usable Area	X'81'
Character Sets	X'85'
Color	X'86'
Highlighting	X'87'
Reply Mode	X'88'
Implicit Partition	X'A6'

SCS Data Stream

The printer-LT can operate as an SNA LU-1 (SCS mode) printer.

SCS Control Codes

The printer-LT supports the following SCS control codes.

Attribute Type	Mnemonic	Code
Carriage Return	CR	X'0D'
Line Feed	LF	X'25'
New Line	NL	X'15'
Back Space	BS	X'16'
Form Feed	FF	X'0C'
Horizontal Tab	HT	X'05'
Vertical Tab	VT	X'0B'
Set Horizontal Format	SHF	X'2BC1'
Set Vertical Format	SVF	X'2BC2'
Set Line Density	SLD	X'2BC6'
Vertical Channel Select	VCS	X'04'
Transparent	TRN	X'35'
Interchange-Record Separator	IRS	X'1E'
Bell Function	BEL	X'2F'
Inhibit Presentation	INP	X'24'
Enable Presentation	ENP	X'14'
Graphic Escape	GE	X'08'
Set Attribute	SA	X'28'
Page Presentation Media	PPM	X'2B D2 LL 48'
Set Print Density	SPD	X'2B D2 LL 29'

The SCS codes are defined as follows:

Carriage Return (CR): is a format control code that moves the print position horizontally to the left margin on the same line. If the print position is already at the left margin, the function is inoperative.

Line Feed (LF): is a format control code that moves the print position down to the next line without a CR.

Back Space (BS): is a format control code that moves the print position, horizontally, one column to the left. If the current print position is at column 1, the function is inoperative. Left margin settings are ignored.

Form Feed (FF): is a format control code that moves the print position to the top left margin of the next form. FF may be specified anywhere in the print data stream.

Horizontal Tab (HT): is a format control code that moves the print position horizontally, from left to right, to the next tab stop setting. Horizontal tab stop values are set by using the Set Horizontal Format (SHF) function. If there are no horizontal tab stops set to the right of the current print position, the horizontal tab function results in a space. If an HT function is requested after passing the maximum print position (MPP), a new line function is performed.

Vertical Tab (VT): is a format control code that moves the print position, vertically, down to the next vertical tab stop setting. Vertical tab stops are set by using the Set Vertical Format (SVF) function. If there are no vertical tab stops below the current print position, the vertical tab function results in an LF function. If a VT function is requested on the bottom margin (BM), the form feed function is performed.

Set Horizontal Format (SHF): is a data-defining control that is used to set the horizontal format controls. These include the maximum print position, the left margin, the right margin, and the horizontal tab stops. A one-byte binary count follows the SHF code that indicates the number of bytes to the end of the SHF string (including the count byte). The first three bytes following the count byte define the maximum print position (MPP), the left margin (LM), and the right margin (RM), respectively. The tab stop settings follow the right margin setting. All values are expressed as one-byte binary numbers.

The minimum SHF sequence is a one-byte length that set the horizontal format controls to their default values. The default values for each function is as follows:

Function	Default
MPP	Setup Value
LM	1
RM	MPP
HT	Every Column

The SHF sequence is: (SHF) (cnt) (MPP) (LM) (RM) (T1) (T2) ... (Tn)

MPP is used to define a line length of less than or equal to, the platen length. The MPP default value is the Setup Value.

LM specifies the column value of the leftmost print position. The LM also serves as the first horizontal tab stop. Valid LM values are less than, or equal to, the MPP and less than the RM.

The RM specifies the right margin and is not used in printing operations. Valid RM values are less than or equal to MPP, and greater than or equal to the LM.

T1 ... Tn are horizontal tab stop settings that set column values for use with the horizontal tab function. The tab stops need not be in order. Valid tab stop settings are equal to, or greater than, LM and less than, or equal to, the RM. If no tab stops are set, the default is a space function.

The parameters must be specified in the preceding sequence. If some parameters are zero, or are not included in the SHF sequence, the default value is taken.

An error condition is established and a sense code = hex '1005' (parameter error) is returned to the control unit if any of the following conditions occurs:

- The MPP specified is greater than the maximum print position of the attached printer.
- The LM is greater than the MPP.
- The RM is less than the LM or greater than the MPP.
- The tab stop values are outside the valid range.

Before the SHF is received, the MPP is set at the Setup Value, LM is 1, and RM is the same as the MPP.

Set Vertical Format (SVF): is a data-defining control that is used to set the vertical format controls. These include the maximum print line (MPL), the top margin (TM), the bottom margin (BM) and the vertical tab stops. A one-byte binary count follows the SVF code that indicates the number of bytes to the end of the SVF string (including the count byte).

The first three bytes following the count byte define the maximum print line (MPL), the top margin (TM), and the bottom margin (BM), respectively. The tab settings follow the bottom margin setting. All values are expressed as one-byte binary numbers.

The minimum SVF sequence is a one-byte length, which sets the vertical format controls to their default values. The default values for each function are as follows:

Function	System Default	Device Default
MPL	1	Setup Value
TM	1	1
BM	MPL	MPL
VT	Every Line	every line

Note: At power-on, the SCS MPL default is set to the printer setup value.

The SVF sequence is: (SVF) (cnt) (MPL) (TM) (BM) (T1) (T2) ... (Tn)

MPL defines the page length. All values from 1 to 127 are valid.

TM specifies a line value to be used in place of line 1 for the top of the page. The TM is also the first vertical tab stop. Valid TM values are equal to, or less than, the MPL.

To ensure correct line feeding of the paper forms, it is recommended that a TM line value of one be set for the first print line on the paper forms.

BM specifies the line value, and, if exceeded, causes an automatic skip to the top margin of the next page. The MPL must be specified when the bottom margin (BM) is specified. Valid BM values must be greater than, or equal to, the TM and less than, or equal to, the MPL.

T1...Tn are vertical tab stop settings, which set line values for use with the vertical tab function. Vertical tab stops must be listed in increasing order. Valid tab stop values are equal to, or greater than, the TM and are equal to, or less than, the BM. The MPL must be specified as a value greater than 1. The TM and T1 through T11 also specify the vertical channel 1 through 12 respectively.

The parameters must be specified in the preceding sequence. If the length value is 1, the device default is taken. If some parameters are zero, or are not included in the SVF sequence, the printer-LT uses the system default values.

An error condition is established and a sense code = hex '1005' (parameter error) is returned to the control unit if any one of the following occurs:

- The MPL specified is greater than the maximum print line (127).
- The TM is greater than the MPL.
- The BM is greater than the MPL or less than the TM.
- The tab stop values are outside the valid range.

If the SVF code is not specified, the printer-LT uses the MPL value previously set by the printer setup. BM is equal to the MPL and TM is equal to 1.

Set Line Density (SLD): Specifies the distance to be moved for single-line vertical spacing, as in LF or NL. The SLD code precedes the setting of parameters. The first parameter byte is a count field. If the count field is X'01', the setup value is taken. If the count field is hex '02', the second parameter byte specifies the distance the form is to be moved for single-line vertical spacing.

The SLD sequence is:

Code	First Parameter	Second Parameter
SLD	hex '02'	hex '09' = 8 LPI
		hex '0C' = 6 LPI
		hex '12' = 4 LPI
		hex '18' = 3 LPI
		hex '00' = 6 LPI
		(Printer default)

The SLD code must be set prior to setting the SVF value, in order to calculate the correct page length. If the SLD code is not specified, the printer-LT uses the LPI value previously set by the printer setup.

An error condition occurs and a sense code = hex '1005' (parameter error) is sent to the control unit for any of the following conditions:

- SLD values other than hex '09', '0C', '18', '12', '00' are received.
- First parameter values other than hex '02' or '01' are received.

Vertical Channel Select (VCS): is a formatting control used to select one of twelve vertical channels for the purpose of controlling the vertical format of a presentation surface.

Line stop values for each channel used must be designated before using these select functions if default values are not to be used.

When the current line number is greater than or equal to the largest line value specified for the channel selected, positioning is to the next page, and the line value specified for the selected channel is used. When there are no line stop values specified for a channel, a select channel function for that channel defaults to LF (line feed).

VCS appears as:

04	CODE

where:

Select function	Code
Select channel one	X'81'
Select channel two	X'82'
Select channel three	X'83'
Select channel four	X'84'
Select channel five	X'85'
Select channel six	X'86'
Select channel seven	X'87'
Select channel eight	X'88'
Select channel nine	X'89'
Select channel ten	X'7A'
Select channel eleven	X'7B'
Select channel twelve	X'7C'

Transparent (TRN): is a data-definition character, that provides for transmitting data in transparent mode. A one-byte binary value follows the TRN code, which specifies the number of bytes of transparent data to follow. The length does not include the length byte. Transparent data is user-defined and is not checked for SCS control codes. As each data byte is interpreted, the print mechanism moves one character position. Valid graphics are printed and invalid graphics are printed as hyphens (-).

Interchange Record Separator (IRS): is defined as a grouping control character, that terminates an information block called a record. When an IRS is received, an NL function is performed by the printer.

Bell (BEL): causes the audible alarm to sound once.

Inhibit Presentation (INP): is accepted by the printer but has no effect on the printing, and no function is performed.

Enable Presentation (ENP): is accepted by the printer but has an effect on the printing, and no function is performed.

Graphic Escape (GE): is used to select APL/Text characters. The GE is the first code of a two-code sequence defining an APL character. The second code is the EBCDIC code representing the selected APL character.

Set Attribute (SA): is a control code that is used to set the highlighting, color, and character set attributes. Byte 0 contains the SA control code (hex '28'). Bytes 1 and 2 contain the attribute type and attribute value, respectively. Each attribute value continues in effect, until another attribute value of that attribute type is received (or the default condition occurs). Each beginning chain will reset the attribute value to default, that is, normal highlighting, color (black) and non-loadable base character set.

The four attribute types are defined as follows:

Type	Name
Hex '00'	Reset
Hex '41'	Set Highlight
Hex '42'	Set Color
Hex '43'	Set Character Set

Note: All other values will be rejected with a sense code = hex '1003' (function not supported).

The following values for each attribute type can be set:

Type	Value	Defined as
Hex '00' (Reset)	Hex '00'	Reset highlighting, color, and character set attributes to default
Hex '41' (Highlight)	Hex '00' Hex 'F1' Hex 'F2' Hex 'F4'	Normal Normal Normal Underline

Note: All other values will be rejected with a sense code = hex '1003' (function not supported).

Type	Value	
Hex '42' (Color)	Hex '00' Hex 'F1' Hex 'F2' Hex 'F3' Hex 'F4' Hex 'F5' Hex 'F6' Hex 'F7'	Blank Blank Blank Blank Blank Blank Blank Blank
Hex '43' (Character set)	Hex '00' Hex 'F1' Hex 'FF' Other value	Base APL Rejected with a sense code Hex '1003' (function not supported) Rejected with a sense code Hex '0863' (illegal LCID selection)

Note: All other values are rejected with a sense code = hex '0863' (illegal LCID selection).

Outbound Structured Field

The Function Management Header (FMH) is used by the host programs to transmit the outbound structured fields to printer-LT. Only FMH type 1 is supported by printer-LT.

The following figure shows the outbound format of FMH type 1.

Byte	Value	Description
0	L X'06'	Length of Header
1	X'01'	FMH type 1
2	X'00'	Always Zero
3	X'0B'	Outbound structured field included with this FMH
4	X'60'	No compressed data
5	X'00'	Always Zero

Note: Values other than those indicated above will be rejected with sense code hex '1008'.

The following figure shows the outbound structured field functions supported by the printer-LT.

Structured field name	ID
Read Partition	X'01'
SCS Data	X'41'

All other structured fields are rejected with a negative response.

Read Partition See the description of Read Partition in "Data Stream Functions for Display-LT."

SCS Data The SCS Data structured field allows SCS data to be sent in the same chain as other structured field.

Byte	Content	Description
0-1	L	Length of this structured field
2	X'41'	SCS Data
3	X'00'	Partition ID (PID)
4-N	DATA	SCS DATA

Inbound Structured Field

The Function Management Header (FMH) is used by the printer-LT to transmit the inbound query reply structured fields to the host program. A single FMH can send one or more structured fields. Only FMH type 1 is supported by the printer-LT.

The following figure shows the inbound format of FMH type 1.

Byte	Value	Description
0	X'06'	Length of Header
1	X'01'	FMH type 1
2	X'00'	Always Zero
3	X'8B'	Inbound structured field included with this FMH

Byte	Value	Description
4	X'60'	No compressed data
5	X'00'	Always Zero

The following shows the inbound query reply structured fields supported by the printer-LT.

Name of Query Replies	ID
Summary	X'80'
Usable Area	X'81'
Character Sets	X'85'
Color	X'86'
Highlighting	X'87'
Device Characteristics QR	X'A0'
Data Streams QR	X'A2'
Paper Feed Technique QR	X'A7'

Error Code Charts

This section contains error codes that may appear in the operator information area. These codes are used for determining where problems exist if they are not in the display station.

3174/3274-Detected Machine Check Errors

The 2nn/3nn (nn = any number from 00-99) indicate machine checks. The following seven codes are 3174/3274-detected machine-check errors unique to distributed function devices. See the *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061 and *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218, for a description of other 2nn/3nn error codes. The following figure shows both the 3174/3274-detected and the display station detected interface errors.

Table B-2. Interface Errors

Error Code	Probable Cause	Action
240	Synchronization error based on a display station problem.	1. Turn the display station power off, then on again.
241	Synchronization error based on 3174/3274 problem.	2. Wait 2 minutes. 3. If the problem persists, follow your local procedures for reporting problem.
242	The display station permanent error reported to the 3174/3274 control unit.	
243	Against 3174's/3274's function request, the display station does not return either Function Completion Status or Expedited Status.	
386	Diskette overrun	1. Press the Reset key and retry the operations. 2. If the problem persists, follow local procedures for reporting problems.
388	Diskette media error	1. Press the Reset key and retry the operation. 2. Replace the diskette. 3. If the problem persists, follow local procedures for reporting problems.
389	Unknown diskette or hardware error	1. Press the Reset key and retry the operation. 2. If the problem persists, follow local procedures for reporting problems.

3174/3274-Detected Program Checks

The 4nn (nn = any number from 00-99) error conditions are those detected by the 3174/3274. The corresponding error codes are sent to the attached display station (Refer to the *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061 and *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218.)

Communication Check Errors

The 5nn (nn = any number from 00-99, except 90) error conditions are detected by the 3174/3274. The corresponding codes are sent to the attached display station. (Refer to the *IBM 3274 Control Unit Description and Programmer's Guide*, GA23-0061 and *IBM 3174 Subsystem Control Unit Functional Description*, GA23-0218.)

The 590 error condition indicates that the 3174/3274 no longer responds to device requests.

Display Station Detected Machine-Check Errors

The following figure lists the machine check errors detected by the display station.

Table B-3 (Page 1 of 4). Display Station Detected Machine Check Errors

Error Code	Probable Cause	Action
610	3174/3274 not ready	1. Check the following. • Correct diskette is inserted. • Diskette door is closed. • 3174/3274 is powered on. • IML is completed. 2. Turn the display station power off, then on again. 3. Wait 2 minutes. 4. If the problem persists, follow your local procedures for reporting problems.
	Coaxial cable problem	1. Ensure that the coaxial cable is securely connected to the 3174/3274. 2. Turn the display station power off, then on again. 3. Wait 2 minutes. 4. If the problem persists, follow your local procedures for reporting problem.
	ASCII session is not supported by the control unit. (if displayed only on the AEA session.)	If the ASCII session is not needed, delete the session from the offline setup.
611	Diskette file ID not matched. Wrong diskette file contents.	1. Check that the correct diskette is inserted and the diskette version is D40.00/N40.00 or higher.
612	Wrong diskette file checksum	2. Turn the display station power off, then on again. 3. Wait 2 minutes. 4. If the problem persists, follow your local procedures for reporting problem.
614	Keyboard language mismatch	1. Press the Reset key. 2. Select another keyboard layout in offline setup.

Table B-3 (Page 2 of 4). Display Station Detected Machine Check Errors		
Error Code	Probable Cause	Action
620	Invalid keyboard scan code	1. Press the Reset key and retry the operation.
621	Keyboard parity error	2. If the problem still exists, go to "Keyboard Test" on page 5-35.
622	Keyboard timeout	
630	Unknown diskette or hardware error	1. Press the Reset key and retry the operation. 2. If the problem persists, follow local procedures for reporting problems.
631	Diskette file not found	1. Press the Reset key and retry the operation. 2. Check that the correct diskette is in the 3174/3274. 3. If the problem persists, follow local procedures for reporting problems.
632	Diskette media error	1. Press the Reset key and retry the operation. 2. Replace the diskette. 3. If the problem persists, follow local procedures for reporting problems.
633	Diskette overrun	1. Press the Reset key and retry the operations. 2. If the problem persists, follow local procedures for reporting problems.
634	Unable to write to diskette file	1. Check that the correct diskette is in the 3174/3274. Press the Reset key and retry the operation.
635	Diskette not ready	2. If the problem persists, follow local procedures for reporting problems.
636	Diskette file locked (File is being used by another operator)	1. Press the Reset key and wait until the other operator is finished before trying again. 2. If the problem persists, follow local procedures for reporting problems.
637	Diskette file overflow	1. Press the Reset key and retry the operation.
638	Not able to read the diskette file	2. If the problem persists, follow local procedures for reporting problems.
639	Diskette file not locked	
640	Wrong diskette in 3174/3274	1. Make sure the correct diskette is in the 3174/3274. Press the Reset key and retry the operation. 2. If the problem persists, follow local procedures for reporting problems.
643	Mouse error	1. Press the Reset key and retry the operation. 2. If the problem persists, go to "Mouse Problem" on page 5-30.

Table B-3 (Page 3 of 4). Display Station Detected Machine Check Errors		
Error Code	**Probable Cause**	**Action**
651	RAM parity error	1. Turn the display station power off, then on again. 2. Wait 2 minutes. 3. If the problem persists, go to "Logic Element Check Procedure" on page 5-38.
660	Microcode error (divide zero error)	1. Turn the display station power off, then on again. 2. Wait 2 minutes. 3. If the problem persists, go to "Logic Element Check Procedure" on page 5-38.
661	Microcode error	
662	Microcode error	
663	Microcode error	1. Turn the display station power off, then on again. 2. Wait 2 minutes. 3. If the problem persists, go to "Logic Element Check Procedure" on page 5-38.
664	Microcode error (stack overflow)	
665	Microcode error	
666	Microcode error	
667	Microcode error	1. Turn the display station power off, then on again. 2. Wait 2 minutes. 3. If the problem persists, go to "Logic Element Check Procedure" on page 5-38.
668	Microcode error	
669	Microcode error (invalid jump)	
670	Keyboard fatal error	
672	Microcode error	1. Turn the display station power off, then on again. 2. Wait 2 minutes. 3. If the problem persists, go to "Logic Element Check Procedure" on page 5-38.
673	Microcode error	
674	Microcode error	
675	Microcode error	
676	Microcode error	1. Turn the display station power off, then on again. 2. Wait 2 minutes. 3. If the problem persists, go to "Logic Element Check Procedure" on page 5-38.
677	Microcode error	
678	Microcode error	
679	Microcode error	
671	Tablet error	1. Turn the display station power off, then on again. 2. Wait 2 minutes. 3. If the problem persists, go to "Logic Element Check Procedure" on page 5-38.
680	NVM error (not initialized)	
681	NVM error (setup)	
682	NVM error (notepad)	
683	NVM error (vital product data)	1. Turn the display station power off, then on again. 2. Wait 2 minutes. 3. If the problem persists, go to "Logic Element Check Procedure" on page 5-38.
684	NVM error (extended vital product data)	
685	NVM error (change format)	
686	NVM error (service information)	

Table B-3 (Page 4 of 4). Display Station Detected Machine Check Errors		
Error Code	**Probable Cause**	**Action**
687	NVM error (record/play)	1. Turn the display station power off, then on again.
688	NVM error (patch)	2. Wait 2 minutes.
689	NVM error (more than 2 fields)	3. If the problem persists, go to "Logic Element Check Procedure" on page 5-38.
697	Expedited status queue overflow	
698	Asynchronous status queue overflow	
699	Undetermined error	

Program Error Codes

The following figure is a list of error status codes. When these errors occur, you should do the following:

1. Press the Reset key and try again.

2. If the problem persists, follow local procedures for reporting problems.

Table B-4 (Page 1 of 4). Program Error Codes		
Error Code	**Probable Cause**	**SNA Sense Code or Non SNA Op-Check**
701	Category not supported	1007
702	RU > 1,536 bytes received (SNA buffer overrun condition)	1007
703	Function not supported: • Unsupported Session Control request • Unsupported Data Flow Control Request • Invalid Signal request code (not 0001XXXX)	1003 Op-Check
704	Format indicator (FI) bit not allowed	400F
705	Sequence number error	2001
706	Chaining error	2002
707	Bracket state error	2003
708	Data traffic reset state	2005
709	HDX error	2004
711	Session limit exceeded	0805
712	Bracket bid reject	0813
713	Session already bound	0815
714	No LU-LU session	8005
715	LU not active	8009
716	Not enough bytes in the BIND RU	0821

Error Code	Probable Cause	SNA Sense Code or Non SNA Op-Check
717	Invalid support level (bytes 1-3)	0821
718	Invalid PLU protocol (byte 4)	0821
719	Invalid SLU protocol (byte 5)	0821
720	Invalid common protocol (bytes 6-7)	0821
721	Less than 64-byte RU length specified (byte 10)	0821
722	Invalid combination of outbound pacing count and maximum outbound RU size	0821
723	Invalid LU type (byte 14)	0821
724	Invalid screen size (bytes 20-24)	0821
725	Cryptography not supported (byte 26)	0821
726	Negative SNA response from the host	
727	SNA Exception Request received	
728	An RM, RMA, or RB command or a Read Partition SF type received with EB and/or CD	0829
729	Read Partition SF received in retry state	0871 Op-Check
750	Invalid command received	1003 CMD-REJECT
751	SFE, MF, or SA order with invalid character set value in the range X'01' - X'FE'	0863 Op-Check
752	• Invalid address received following an SBA, RA, or EUA order. • MF order addressed to a notified attribute location.	1005 Op-Check
753	• Data follows an RM, RMA RB, or EAU command. • GE or RA order received with invalid character. • SFE, MF, or SA order with invalid attribute value for highlight or color or a character set value of X'FF'.	1003 Op-Check
754	Data Stream ended before all required bytes for an SBA, RA, EUA, SF, SFE, MF, SA, or GE order were received.	1005 Op-Check
755	Invalid order received (EBCDIC value less than X'40' not recognized)	1003 Op-Check
756	• Invalid, structured field type. • Structured field type not supported for current configuration.	1003 Op-Check
757	• Load PS SF with invalid PS alias • Load PS SF load type not supported	1003 Op-Check
758	Set reply mode SF received with invalid mode	1003 Op-Check

Table	B-4 (Page 3 of 4). Program Error Codes	
Error Code	**Probable Cause**	**SNA Sense Code or Non SNA Op-Check**
759	• Read Partition SF not last SF. • SF type incomplete • SF length invalid. • Set Reply Mode SF with field/ext field mode and data following SF • Length 0000 but not last SF • Load PS SF length error	1005 Op-Check
760	• Erase/Reset SF reserved fields not zero • Set Reply Mode SF attribute type reserved	1003 Op-Check
761	• Structured field type PID invalid • Query PID is not X'FF'	1005 Op-Check
762	Create Partition structured field: parameter error	1005 Op-Check
764	• Load PS SF addressed PS invalid • Load PS SF extension invalid color bits	084C Op-Check
765	• Load PS SF with invalid load start point • Load PS SF with invalid code point of X'FF' • Load PS SF contains too many symbol definitions	1005 Op-Check
766	• Load PS SF with incomplete PS cell data • Load PS SF with invalid end flag for type 2 PS • Load PS SF with invalid type 2 header (end flag encountered and not end of data)	1005 Op-Check
767	• Create Partition structured field with invalid address mode. • Create Partition structured field with bits 0-3 of byte 4 not zero.	1003 Op-Check

768	• Load PS SF extension
	  Invalid x units
	  Invalid y units
	  Invalid extended
	  Parameter length or extended parameter length if missing
	• Ending code point less than start point
	• Cell dimensions: incompatible with existing definitions
		1005 Op-Check

769	• Load PS SF extension invalid byte 8 (Reserved bits 3 to 7 not zero) • Byte 11 not zero • Byte 12 bits 5 to 7 not zero	1003 Op-Check
770	Outbound 3270DS SF with start print in WCC, but not last structured field	1001 Op-Check
771	Invalid command in structured field	1003 Op-Check
772	Resource requested temporarily unavailable	084B Op-Check
773	Invalid structured Field following Destination/Origin Structured Field	1005 Op-Check

Table	B-4 (Page 4 of 4). Program Error Codes	
Error Code	**Probable Cause**	**SNA Sense Code or Non SNA Op-Check**
780	• Miscellaneous Graphics Program Check • OEM Data, Graphic Data, Picture, or Control SF, spanning SF inconsistency	1003/1005 Op-Check
781	• Graphic Drawing Processor Check • Drawing Order error	1003/1005 Op-Check
782	• Graphic Procedure Processor Check • Procedural Instruction error	1003/1005 Op-Check
795	WCC with Error	OP-Check

Appendix C. Keyboard Definition Utility

This appendix describes the operation of the keyboard definition utility.

The keyboard definition utility is a capability of the 3472-G to perform the functions that are needed to re-arrange the keyboard layout. Most characters, symbols, and functions can be exchanged, copied, or deleted from any key position on the keyboard using the keyboard definition utility. Diacritical characters or marks can also be copied to or exchanged with any specific key, or deleted.

A step-by-step procedure for using this utility is covered in "Procedure for Keyboard Definition Operation" on page C-5. You need to note the following characteristics of the keyboard definition utility to prepare for this procedure.

Which controller is your 3472-G attached to?	How many keyboard layouts can be specified?	Which function is available?	APL layer definable?
IBM 3174 Subsystem Controller (except Models 81R, 91R, and 92R) IBM 9373 Processor IBM 9375 Processor IBM 9377 Processor	6 **122/124-key** 3 **IBM Enhanced** 3	Copy, exchange, delete	Except the IBM Enhanced keyboard
IBM 3274 Control Unit	1	Copy	No

Notes:

1. When attached to the 3274:

   - only I/O table copy and partial function key changes are available
   - current keyboard type can only be defined

2. Do not use the 3472-G for the keyboard definition operation when the other 3472-G is used for the keyboard definition operation on the same control unit.

Panel Flow and Keys Used in Defining Keyboard Layouts

The following shows the panel flow and keys used in defining keyboard layouts.
This figure gives you a conceptual view of the keyboard definition utility operation.
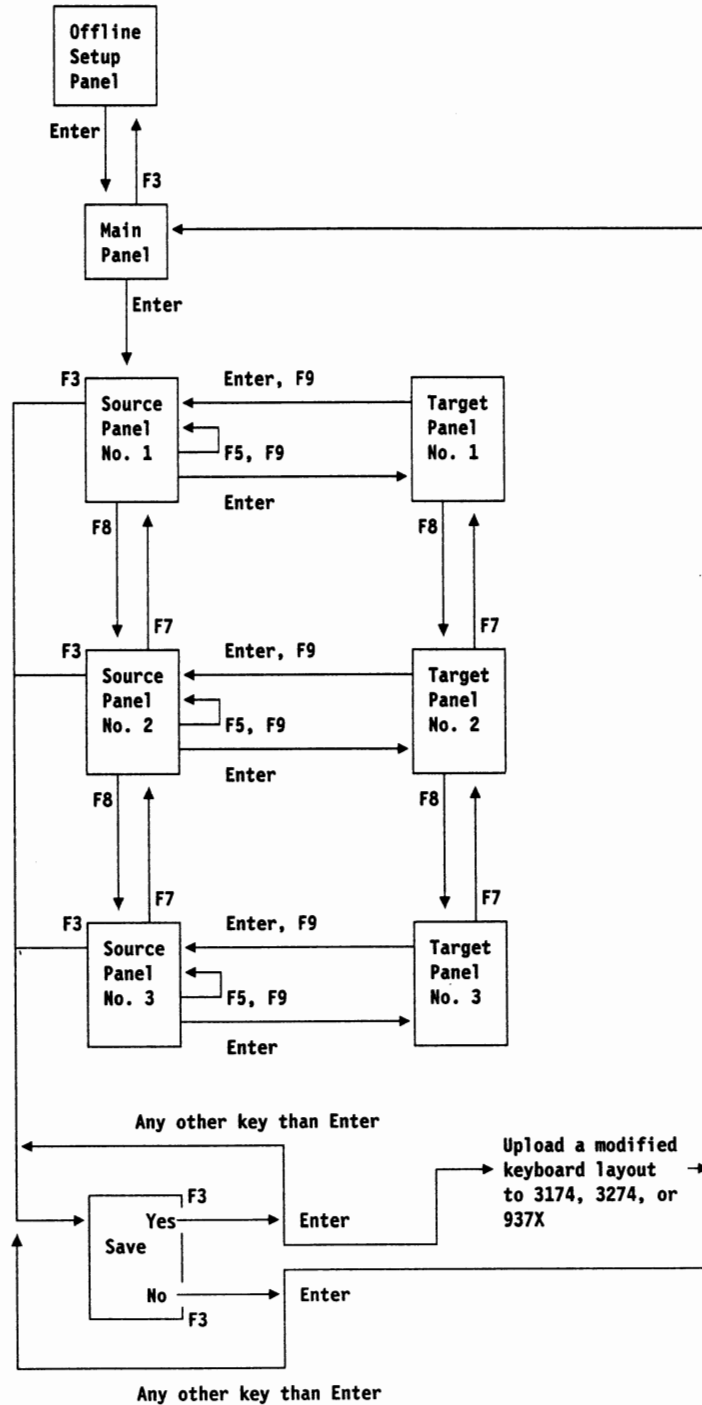
Figure   C-1. Panel Flow and Keys Used (3174, Alpha Layer)
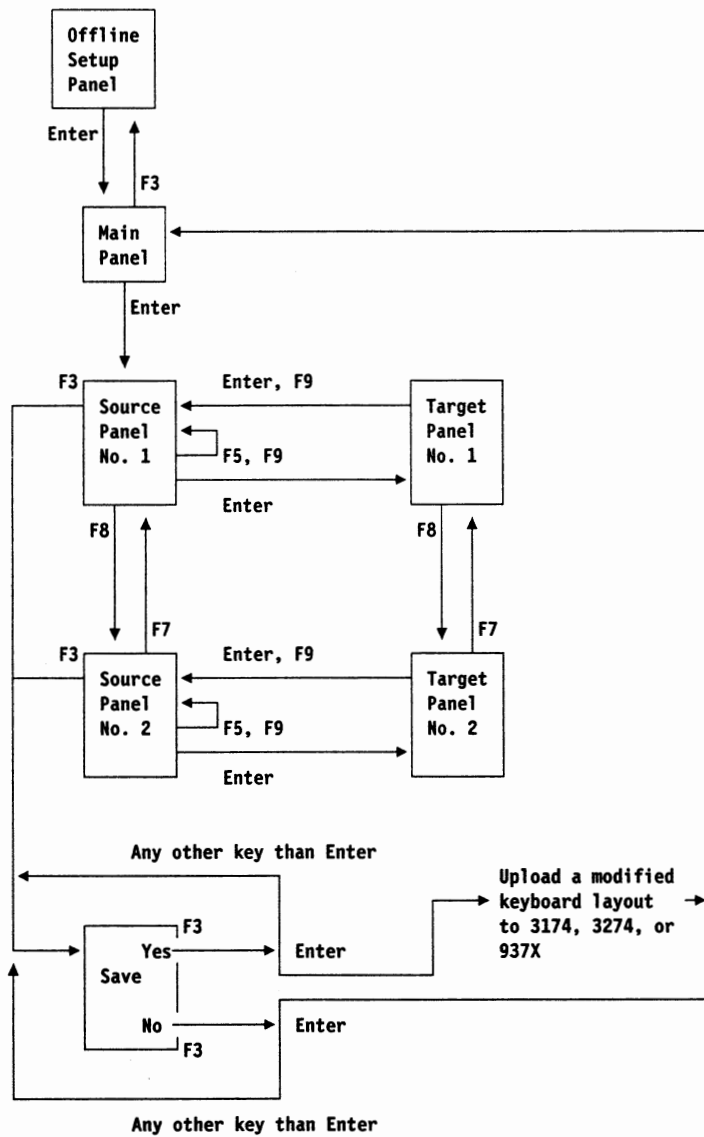
Figure   C-2. Panel Flow and Keys Used (3174, APL & Kana Layer)

```
                          ┌─────────┐
                          │ Offline │
                          │ Setup   │
                          │ Panel   │
                          └─────────┘
                   Enter │     ↑
                         ↓     │ F3
                          ┌─────────┐
                          │ Main    │◄──────────────────────┐
                          │ Panel   │                       │
                          └─────────┘                       │
                              │ Enter                        │
                              ↓                              │
          F3   ┌─────────┐  Enter, F9   ┌─────────┐          │
           ┌───│ Source  │◄─────────────│ Target  │          │
           │   │ Panel   │              │ Panel   │          │
           │   │ No. 1   │◄── F5, F9    │ No. 1   │          │
           │   └─────────┘              └─────────┘          │
           │        │      Enter                             │
           │        └──────────────────►                     │
           │                                                 │
           │    Any other key than Enter                     │
           │  ◄──────────────────────────┐                   │
           │                             │                    │
           │                          ┌F3│   Upload a modified │
           │                    Yes───┤  Enter  keyboard layout │
           │            Save          │  ────►  to 3174, 3274, or
           │                          │         937X  ──►      │
           │                    No ───┤  Enter                 │
           │                          └F3  ────►───────────────┘
           │
           └──── Any other key than Enter
```
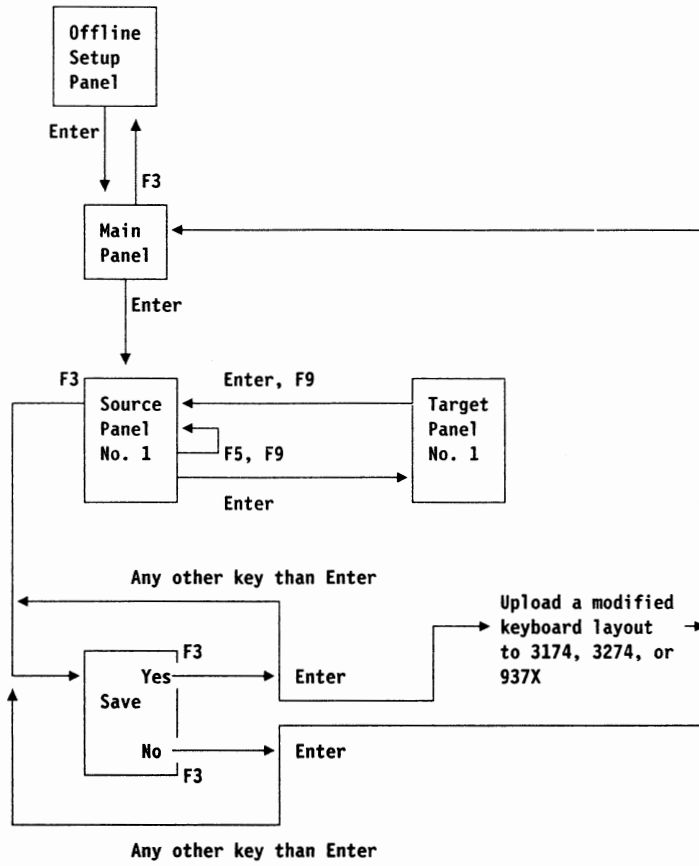
Figure C-3. Panel Flow and Keys Used (3274)

Procedure for Keyboard Definition Operation

1 Fill in the Keyboard Layout Sheet

Record all new keyboard arrangements on the Setup Sheet provided on page C-36 and C-37. When the original keyboard layout is changed using this function, you need to keep the setup sheet for future reference. When the keyboard or controller is replaced and the unique keyboard layout is no longer valid, you may need to do the keyboard definition operation again. Figure 4-1 on page 4-1 shows the standard layout of the U.S. English 122-key keyboard. Figure 4-2 on page 4-1 shows the standard layout of the U.S. English IBM Enhanced keyboard.

2 Select Change Keyboard Layout

Do the following:

a If your 3472-G is attached to the 3174 or 937X, insert the Load Diskette into the controller.

b Power on the 3472-G while holding down the Space Bar. The Offline Setup panel appears.

c In the Offline Setup Panel, move the Cursor to "Change keyboard layout", and press the Enter key. The Main Panel appears.

3 Selection in the Main Panel

Select the appropriate value for each item from the Main Panel shown in Figure C-4 on page C-6. The values in bold characters indicate the defaults.

To make a selection, move the Cursor to an item using the Cursor Move keys (↑ ↓ ← →) and press the Space Bar to select to. The desired value is displayed in **reverse** video. Press the Enter key when all choices are selected. Explanation of each value is provided in Table C-1 on page C-7.

```
                  Keyboard Definition Utility

  Move cursor to desired choice, and press SPACE BAR to select.
  Press Enter when done.


    Keyboard  . . . . . . . .   122/104    Enhanced
    Keyboard layout  . . . .    Standard   User1      User2      User3
    Keyboard layer . . . . .    ALPHA      APL
    Keypad  . . . . . . . . .   Current    Numeric    Function   F/Numeric
    Alt and Enter . . . . . .   1          2



                              1 │ Enter │   │ Alt │  2 │ Alt │   │ Enter │

    PA3 and Jump  . . . . . .   1          2


                              1 │PA3  │          2 │Jump │
                                │Jump │            │PA3  │


    F3=Exit
    SETUP
```
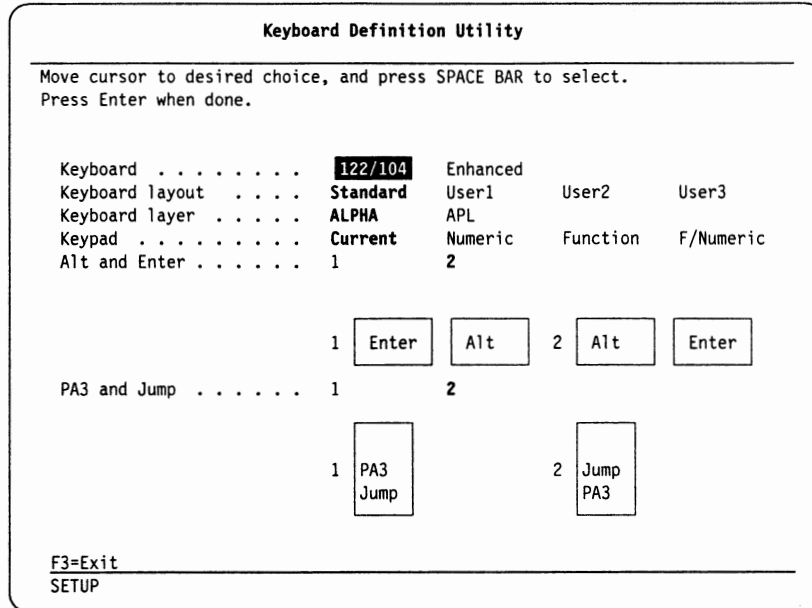
Figure   C-4. Main Panel

Note: The above figure is dependant on the control unit model that the
display station is attached to.

```
  Upper shift  ──────▶ │ Z │
  Lower shift  ──────▶ │ z │
  Alt shift    ──────▶ │   │
```
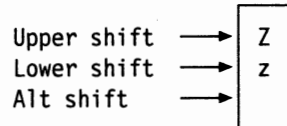
On the Audible Alarm

During the keyboard definition operation, the audible alarm may sound.
The causes and the actions to take are summarized as follows:

- *An invalid key was pressed.*

  Press a valid key. Valid keys are: Alt, Back Tab, Ctrl, Cursor move
  keys (↑ ↓ ← →), Enter, ExSel, Function keys displayed on a panel,
  Home, Ident, Next Line, Print, Quit, Shift Lock, Space specified as
  source or target key in a panel, Tab keys, Test, Upshift.

- *You tried to copy or exchange between a key in FULL mode and a key
  in PARTIAL mode or vice versa. Or you tried to delete a key whose
  mode attribute is FULL in PARTIAL mode or vice versa.*

  Carefully read the labeled boxes placed in each step and retry.

- *You tried to delete the last key out of a set of multiple-keys.*

  This case happens, for example, when the last key is specified to be a
  delete or copy target. Keep at least one key out of a set of multiple-
  keys.

- *You tried to change an operation (COPY or XCHNG) or a shift mode
  (FULL or PARTIAL) in a target panel that differs with source panel
  specifications.*

  Do not change them in a target panel.

When the controller is IBM 3174, 9373, 9375, or 9377

If you copy or exchange functions of keys, press the Enter key after speci-
fying necessary values. The Source Panel No. 1 appears. Go to step 4 on
page C-10

When the controller is IBM 3274

If you exchange only the functions of the Alt and Enter keys, or the posi-
tions of the PA3 and Jump keys, press the F3 key after specifying "1" or
"2"; the Save Panel appears. For instructions on how to operate in the
Save Panel, see step 13 on page C-34.

Table   C-1 (Page 1 of 3). Explanation of Main Panel Selection Items

Selection Item	Possible Value	Explanation
Keyboard*	122/104 (124/106)	Type of keyboard. You can define your keyboard to be a 122/104-key keyboard even if your keyboard is an IBM enhanced keyboard. For the standard layout of the U.S. English 122-key keyboard, see Figure 4-1 on page 4-1.
	Enhanced	Type of keyboard. You can define your keyboard to be an IBM enhanced keyboard even if your keyboard is a 122/104-key keyboard. For the standard layout of the U.S. English IBM enhanced keyboard, see Figure 4-2 on page 4-1.
Keyboard layout	Standard	A table where the unmodified keyboard layout infor-mation on the 122/104 and IBM Enhanced keyboards is saved. The keyboard language assumes that of the keyboard attached. This information is used as a copy or exchange source.
	User1	A table where a modified keyboard layout informa-tion on the 122/104 and IBM Enhanced keyboards has been saved. This information is used as a copy or exchange source, or a delete target. The initial content of this table is the same as the "Standard" table. Three tables, "User1", "User2", and "User3" are pro-vided for saving up to three modified keyboards.
	User2**	See the explanation of "User1".
	User3**	See the explanation of "User1".

Note: The information in this table changes according to the language of the keyboard attached. For example, if you attach the U.S. English 122-key keyboard, perform the keyboard definition operation, and save the modified keyboard layout information into "User1" table, "User1" is not displayed next time you enter this panel with the U.K. English 122-key keyboard attached. This is because "User1" is in use for containing the information on the modified U.S. English 122-key keyboard layout.

Table C-1 (Page 2 of 3). Explanation of Main Panel Selection Items

Selection Item	Possible Value	Explanation
Keyboard layer	ALPHA (Latin)	Alphanumeric shift portion of a copy or exchange source keyboard layout or a delete target keyboard layout.
	APL	APL shift portion of a copy or exchange source keyboard layout or a delete target keyboard layout. This value is effective only when you select "122/104" for the "Keyboard".
	KATAKANA Cyrillic Greek	When your keyboard language is Japanese-KATAKANA, Cyrillic, or Greek, you can define this layer of your keyboard in addition to the "ALPHA" and "APL" layers.
Keypad	Current	Specifying this value means that you do not change the keypad keys definition that was made last.
	Numeric Function F/Numeric	Specifying "Numeric", "Function", or "F/Numeric" defines the keypad keys on your keyboard to be Numeric (left in the following figure), Function (center), or Function/Numeric (right), respectively: [figure of three keypad layouts] **Notes:** 1. "F/Numeric" appears only for the 122/124-key keyboard. 2. When the IBM Enhanced keyboard is selected, the standard (default) layout for the Alt positions will be applied.
Alt and Enter***	1	Specifying "1" transposes the right Alt key and the Enter key functions. That is, the Enter function is assigned to the right Alt key; the Alt function is assigned to the Enter key.
	2	Specifying "2" re-assigns the Alt function to the right Alt key and the Enter function to the Enter key as in the "Standard" keyboard layout.

Table C-1 (Page 3 of 3). Explanation of Main Panel Selection Items		
Selection Item	**Possible Value**	**Explanation**
PA3 and Jump****	1	Specifying "1" transposes the position of the Jump key with the position of the PA3 key. That is, the Jump key functions when the Jump/PA3 key is pressed (while holding down the key that has the Alt function); and the PA3 key functions when the Jump/PA3 key is pressed.
	2	Specifying "2" re-assigns the positions of the Jump and PA3 keys to their original positions as in the "Standard" keyboard layout.

Notes:

*   This item is neither available nor displayed if your display station is attached to the 3274.

**   This item is neither available nor displayed if your display station attached to the 3274.

***   This item is neither available nor displayed if an attached keyboard is the Japanese Katakana IBM Enhanced keyboard or your display station is attached to the 3174.

****   This item is neither available nor displayed if you selected "Enhanced" for the "Keyboard" type or your display station is attached to the 3174.

4 Source Selection (Alphanumeric, Special, or Diacritical Character/Mark)

```
┌──────────────────────────────────────────────────────────────────────────┐
│                    Keyboard Definition Utility              More:  +        │
│  ─────────────────────────────────────────────────────────────────────     │
│  Position cursor under source and press Enter.                              │
│                                                                             │
│                                                                             │
│                                              Diacritical-mark keys          │
│                                                                             │
│                                                     ´                       │
│                                                     `                       │
│                                                     ^                       │
│                                                     ..                      │
│                                                     -                       │
│                                                     o                       │
│                                                     ˛                       │
│                                               │ 456789ABCDEF                │
│  ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐  0 │ ...........0               │
│  │ ˜│ |│ @│ #│ $│ %│ ¬│ &│ *│ (│ )│  │ +│  1 │ ....aj..AJ.1               │
│  │ `│ 1│ 2│ 3│ 4│ 5│ 6│ 7│ 8│ 9│ 0│ -│ =│  2 │ ....bks.BKS2               │
│  └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘  3 │ ....clt.CLT3               │
│      ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐  4 │ ....dmu.DMU4               │
│      │ Q│ W│ E│ R│ T│ Y│ U│ I│ O│ P│ !│ ]│  5 │ ....env.ENV5               │
│      │ q│ w│ e│ r│ t│ y│ u│ i│ o│ p│ ¢│ \│  6 │ ....fov.FOW6               │
│      └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘  7 │ ....gpx.GPX7               │
│       ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐ 8 │ ....hqy.HQY8               │
│       │ A│ S│ D│ F│ G│ H│ J│ K│ L│ :│ "│ }│ 9 │ ....irz.IRZ9               │
│       │ a│ s│ d│ f│ g│ h│ j│ k│ l│ ;│ '│ {│ A │ ............                │
│       └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘ B │ ............                │
│       ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐    C │ ............                │
│       │ >│ Z│ X│ C│ V│ B│ N│ M│ ,│ .│ ?│    D │ ............                │
│       │ <│ z│ x│ c│ v│ b│ n│ m│ ,│ .│ /│    E │ ............                │
│       └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘    F │ ............                │
│              ┌───────────────────┐                                          │
│              │       Space       │                                          │
│              │       Space       │                                          │
│              │       Space       │                                          │
│              └───────────────────┘                                          │
│                                                                             │
│  F3=Exit  F4=Change Operation  F5=Change Shift      F8=Forward  F9=Reset    │
│  SETUP     COPY    PARTIAL                                                   │
└──────────────────────────────────────────────────────────────────────────┘
```
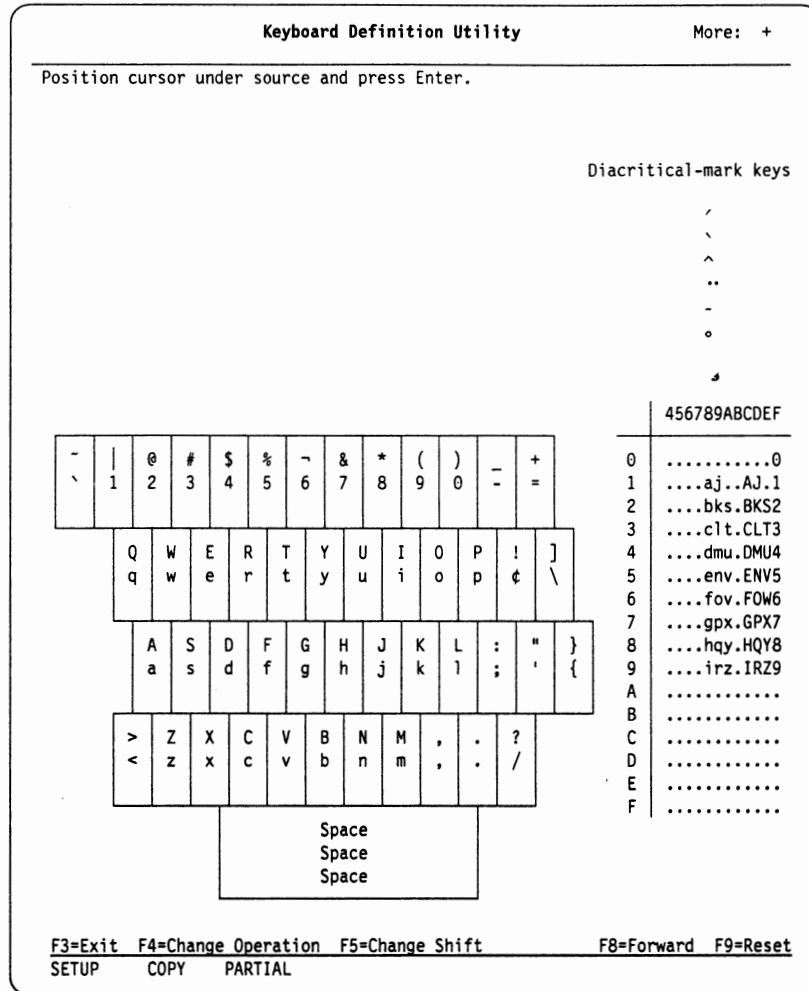
Figure   C-5. Source Panel No. 1

Figure C-5 shows the Source Panel No. 1. From this panel, you can:

- Select an alphanumeric or special character (for example, @, #) to be used as a copy or exchange source

  Note: Special characters may also be referred to as alpha symbols.

- Select a diacritical mark (for example, ´) from the diacritical-mark keys table (near the upper right of the panel) to be used as a copy source

  Notes:

  a. Diacritical marks that you select from the diacritical-mark keys table can be used as dead keys. For how to use dead keys, see Diacritical Mark Key on page 4-9.

  b. A diacritical mark that you selected from the diacritical-mark keys table is displayed in **white** on the target panel after specifying the copy target key.

- Select an alphanumeric, special, or diacritical character (for example, Ä) from the I/O interface code table (near the bottom right of the panel) to be used as a copy source.

Notes:

a. Special characters may also be referred to a alpha symbols.

b. Although you can select diacritical marks from the I/O interface code table, they do not function as dead keys.

> **If your desired source key is not in this panel**
>
> Press the F8 key; the Source Panel No. 2 (control-function key) will appear; Skip the following and go to step 6 on page C-17.

> **How to Cancel**
>
> To cancel the last setting you made in this panel, press the F9 key.

Do the following:

a Specify a type of operation.

By pressing the F4 key repeatedly, "XCHNG" (exchange), "COPY" (copy), and "DELET" (delete) are displayed in sequence in the operator information area.

> **When Delete**
>
> - When you select "DELET" (delete) the panel changes to the Target Panel No. 1, and then do the following:
>
>   - If your delete target key is displayed in **reverse** video on the panel, press the F5 key to select "FULL" for a shift mode.
>
>   - With regard to the other key, go to **b** of step 4b on page C-12.
>
>   - Press the F4 key repeatedly to select "DELET" for a type of operation; the Target Panel No. 1 will appear. Go to step 5 on page C-15.

When Exchange

The Typematic, Make-only, and Make/Break keys have exchange
restrictions on them. The following summarizes these restrictions.

Note: "possible" indicates no restrictions on exchanging the keys.

	Target		
	Typematic Key	Make-only Key	Make/Break Key
S o u r c e — Typematic Key	Possible	Possible but Not recommended	Impossible
Make-only Key	Possible but Not recommended	Possible	Impossible
Make/Break Key	Impossible	Impossible	Possible only in FULL mode

---

When Copy

The Typematic, Make-only, and Make/Break keys have copying
restrictions on them. The following summarizes these restrictions.

Note: "possible" indicates no restrictions on copying the keys.

	Target		
	Typematic Key	Make-only Key	Make/Break Key
S o u r c e — Typematic Key	Possible	Possible but Not recommended	Impossible
Make-only Key	Possible but Not recommended	Possible	Impossible
Make/Break Key	Impossible	Impossible	Possible only in FULL mode
I/O Interface Code Table	Possible only if the target is an alpha- numeric or special character key except keypad key	Impossible	Impossible

---

b Specify a shift mode.

If you repeatedly press the F5 key, "FULL" and "PARTIAL" are dis-
played in the operator information area in a flip-flop manner. FULL
specifies that all the functions of a key in the upper shift, lower shift,
and alt shift positions have been selected to be an exchange or copy
source. PARTIAL specifies that one of the functions of a key in the
upper shift, lower shift, alt shift, exsel shift, and alt-up shift (on the
Enhanced keyboard) positions is selected to be an exchange or copy
source. The following figure illustrates respective functions of a key in
upper shift, lower shift, and alt shift positions.

```
Upper shift ──────►┌───┐
                   │ Z │
Lower shift ──────►│ z │
                   │   │
Alt shift   ──────►└───┘
```

┌─── **Keys that cannot be specified in PARTIAL mode** ──────────────┐

You must specify "FULL" if you select one of the following keys.
They are displayed in **reverse** video on the source panel to indicate
such keys. The keys that can be copy or exchange targets on the
target panel are also displayed in **reverse** video.

Alpha symbols (英記号)	Kana symbols (カナ記号)
英数	Katakana (カナ)
Alt	**英数/カナ**
Ctrl	Latin
Cursor move keys (↑ ↓ ← →)	Reset/Quit
Cyrillic	Shift Lock
Enter	Upshift
Greek	Caps Lock

└──┘

C To make one of the alphanumeric characters (for example, Z) an
exchange or copy source:

Move the Cursor to "Z" as shown in the following figure. Press the
Enter key; the Target Panel No. 1 will appear. Go to step 5 on
page C-15.
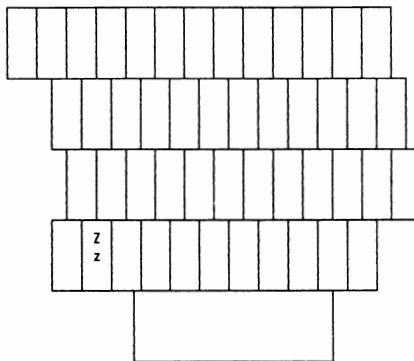
d To select a diacritical mark from the diacritical-mark keys table:

Move the Cursor to "°" in the table; press the Enter key. The Target
Panel No. 1 will appear. Go to step 5 on page C-15.

Diacritical-mark keys

```
        ´
        `
        ^
        ¨
        ¯
        °
        ˒
```

e To make a diacritical character (for example, Ä) an exchange or copy source:

Move the Cursor to "Ä" as shown in the following figure and press the Enter key. The Target Panel No. 1 will appear. Go to step 5 on page C-15.

```
     | 456789ABCDEF
  ---+-------------
   0 | ............
   1 | ............
   2 | ............
   3 | ..Ä.........
   4 | ............
   5 | ............
   6 | ............
   7 | ............
   8 | ............
   9 | ............
   A | ............
   B | ............
   C | ............
   D | ............
   E | ............
   F | ............
```

```
                    Keyboard Definition Utility              More:  +

Position cursor under target and press Enter.


                                                      Diacritical-mark keys

                                                              ´
                                                              `
                                                              ^
                                                              ¨
                                                              -
                                                              °

                                                              ┘
                                                       │ 456789ABCDEF
  ~  │  @  #  $  %  ¬  &  *  (  )  _  +   │ 0  ............0
  `  1  2  3  4  5  6  7  8  9  0  -  =   │ 1  ....aj..AJ.1
                                         │ 2  ....bks.BKS2
                                         │ 3  ....clt.CLT3
     Q  W  E  R  T  Y  U  I  O  P  !  ]  │ 4  ....dmu.DMU4
     q  w  e  r  t  y  u  i  o  p  ¢  \  │ 5  ....env.ENV5
                                         │ 6  ....fov.FOW6
                                         │ 7  ....gpx.GPX7
     A  S  D  F  G  H  J  K  L  :  "  }  │ 8  ....hqy.HQY8
     a  s  d  f  g  h  j  k  l  ;  '  {  │ 9  ....irz.IRZ9
                                         │ A  ............
                                         │ B  ............
     >  Z  X  C  V  B  N  M  ,  .  ?     │ C  ............
     <  z  x  c  v  b  n  m  ,  .  /     │ D  ............
                                         │ E  ............
                       Space             │ F  ............
                       Space
                       Space


F3=Exit                                          F8=Forward  F9=Reset
  SETUP     XCHNG    FULL
```

Figure   C-6. Target Panel No. 1

Figure C-6 shows the Target Panel No. 1. From this panel, you can:

- Specify a target key to which you want to assign an alphanumeric, special, diacritical character, or diacritical mark that you selected in step 4 on page C-10 as an exchange or copy source

- Delete a function of a key.

┌─ **If your desired target key is not in this panel** ─────────────────┐
│   │
│ Press the F8 key; the Target Panel No. 2 (**control-function key**) will appear; │
│ Skip the following and go to step 7 on page C-21.   │
│   │
└───┘

The source key you specified in the Source Panel No. 1 is displayed in **yellow reverse** on the panel.

An operation mode that you specified in the Source Panel No. 1, "XCHNG" (exchange), "COPY" (copy), or "DELET" (delete) is displayed in the operator information area.

A shift mode that you specified in the Source Panel No. 1, "FULL" or "PARTIAL" is displayed in the operator information area.

Before Operation

There are several sets of multiple-keys that must not be deleted. You must keep at least one key out of a set of multiple-keys on your keyboard. The following figure lists the multiple-keys. They are displayed in **green** on the panel.

Alt	SysRq
Ctrl	Test
Cursor move keys (↑ ↓ ← →)	Upshift
Enter	カナ
Reset	英数
SetUp	英数/ カナ
Space	

Note: "Space" needs to be in the Panel No. 1 of Alpha (Latin).

How to Cancel

To cancel the last setting you made in this panel, press the F9 key.

Proceed to the Source Panel No. 2 by pressing the F8 key.

Do the following:

a Specify a target key.

Move the Cursor to a target key and press the Enter key; the Source Panel No. 1 will appear.

If you completed your key definition

Press the F3 key to save your definition. For additional save details, see page C-29.

If you have more keys to be defined

Go to source selection for next source key. The present panel is the Source Panel No. 1. For source selection details, see page C-10.

```
                        Keyboard Definition Utility              More: -+
────────────────────────────────────────────────────────────────────────────
Position cursor under source and press Enter.

ExSel│ DOC │Wrap │ChgFm │     │     │     │ RTM │     │     │     │     │     │
      ├─────┼─────┼──────┼─────┼─────┼─────┼─────┼─────┼─────┼─────┼─────┼─────┤
      │ F13 │ F14 │ F15  │ F16 │ F17 │ F18 │ F19 │ F20 │ F21 │ F22 │ F23 │ F24 │
      │ F13 │ F14 │ F15  │ F16 │ F17 │ F18 │ F19 │ F20 │ F21 │ F22 │ F23 │ F24 │
      │ Red │Pink │Green │Yelow│Blue │Turq │White│ ▶C  │     │CrBnk│AltCr│ +Cr │
      ├─────┼─────┼──────┼─────┼─────┼─────┼─────┼─────┼─────┼─────┼─────┼─────┤
      │ F1  │ F2  │ F3   │ F4  │ F5  │ F6  │ F7  │ F8  │ F9  │ F10 │ F11 │ F12 │
      │ F1  │ F2  │ F3   │ F4  │ F5  │ F6  │ F7  │ F8  │ F9  │ F10 │ F11 │ F12 │
      │ PSA │ PSB │ ▶P   │     │ ⓐ  │ ▶T  │     │     │ ⓐ  │ ⟩a⟨ │ a   │ ▶H  │
ExSel│     │     │      │     │     │     │     │ APL │     │     │     │     │
```

Figure   C-7. Source Panel No. 2

Figure C-7 shows the Source Panel No. 2. From this panel, you can:

- Select a control-function key to be used as a copy or exchange source.

┌─ **If your desired source key is not in this panel** ──────────────────────┐
│   │
│ - Go to Source Panel No. 3 (**keypad key** or **mouse button**); press the F8 │
│   key. Go to step 8 on page C-23.   │
│   │
│ - Go to Source Panel No. 1 (**alphanumeric, special**, or **diacritical**   │
│   **character/mark**); press the F7 key. Go to step 4 on page C-10.   │
│   │
└──┘

┌─ **How to Cancel** ──┐
│   │
│ To cancel the last setting you made in this panel, press the F9 key.   │
│   │
└──┘

To return to the Source Panel No. 1, press the F7 key.

Do the following:

a Specify a type of operation.

By pressing the F4 key repeatedly, "XCHNG" (exchange), "COPY" (copy), and "DELET" (delete) are displayed by turns in the operator information area.

When Delete

- When you select "DELET" (delete) the panel changes to the Target Panel No. 2, and then do the following:

  - If your delete target key is displayed in **reverse** video on the panel, press the F5 key to select "FULL" for a shift mode.

  - With regard to the other key, go to **b** of step 4b on page C-12.

  - Press the F4 key repeatedly to select "DELET" for a type of operation; the Target Panel No. 1 will appear. Go to step 7 on page C-21.

When Exchange

The Typematic, Make-only, and Make/Break keys have exchange restrictions on them. The following summarizes these restrictions.

Note: "possible" indicates no restrictions on exchanging the keys.

		Target		
		Typematic Key	Make-only Key	Make/Break Key
S o u r c e	Typematic Key	Possible	Possible but Not recommended	Impossible
	Make-only Key	Possible but Not recommended	Possible	Impossible
	Make/Break Key	Impossible	Impossible	Possible only in FULL mode

---

┌─── **When Copy** ──┐

The Typematic, Make-only, and Make/Break keys have copying
restrictions on them. The following summarizes these restrictions.

Note: "possible" indicates no restrictions on copying the keys.

		Target		
		Typematic Key	Make-only Key	Make/Break Key
S o u r c e	Typematic Key	Possible	Possible but Not recommended	Impossible
	Make-only Key	Possible but Not recommended	Possible	Impossible
	Make/Break Key	Impossible	Impossible	Possible only in FULL mode
	I/O Interface Code Table	Possible only if the target is an alpha- numeric or special character key except keypad key	Impossible	Impossible

└──┘

b Specify a shift mode.

If you repeatedly press the F5 key, "FULL" and "PARTIAL" are dis-
played in the operator information area in a flip-flop manner. FULL
specifies that all the functions of a key in the upper shift, lower shift,
and alt shift positions have been selected to be an exchange or copy
source. PARTIAL specifies that one of the functions of a key in the
upper shift, lower shift, alt shift, exsel shift, and alt-up shift (on the
Enhanced keyboard) positions is selected to be an exchange or copy
source. The following figure illustrates respective functions of a key in
upper shift, lower shift, and alt shift positions.

```
Upper shift  ──▶ ┌───┐
                 │ Z │
Lower shift  ──▶ │ z │
                 │   │
Alt shift    ──▶ └───┘
```

```
┌─ Keys that cannot be specified in PARTIAL mode ──────────────────┐
│                                                                   │
│ You must specify "FULL" if you select one of the following keys.  │
│ They are displayed in reverse video on the panel to indicate such │
│ keys.  The keys that can be copy or exchange targets on the target│
│ panel are also displayed in reverse video.                        │
│                                                                   │
│ Alpha symbols (英記号)          Kana symbols (カナ記号)            │
│                                                                   │
│ 英数                            Katakana (カナ)                   │
│                                                                   │
│ Alt                             英数/カナ                         │
│                                                                   │
│ Ctrl                            Latin                             │
│                                                                   │
│ Cursor move keys (↑ ↓ ← →)      Reset/Quit                        │
│                                                                   │
│ Cyrillic                        Shift Lock                        │
│                                                                   │
│ Enter                           Upshift                           │
│                                                                   │
│ Greek                           Caps Lock                         │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘

┌─ Keys that cannot be specified in FULL mode ─────────────────────┐
│                                                                   │
│ You must specify "PARTIAL" if you select from keys in exsel shift │
│ position on the standard keyboard or from keys in alt-up shift    │
│ position on the Japanese Katakana IBM Enhanced keyboard.  The keys│
│ in exsel-shift position on the standard keyboard are:             │
│                                                                   │
│  ┌──────┬───────┬───────┬──────┬──────┐                          │
│  │ APL  │ ChgFt │ DocMd │ RTM  │ Wrap │                          │
│  └──────┴───────┴───────┴──────┴──────┘                          │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

c To make a control-function key (for example, "Jump") an exchange or copy source:

Move the Cursor to "Jump" as shown in the following figure and press the Enter key. The Target Panel No. 2 will appear. Go to step 7 on page C-21.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                     Keyboard Definition Utility              More: -+     │
│───────────────────────────────────────────────────────────────────────── │
│ Position cursor under target and press Enter.                             │
│                                                                           │
│  ExSel │ DOC │Wrap│ChgFm│    │    │    │ RTM │    │    │    │    │    │     │
│        ├─────┼────┼─────┼────┼────┼────┼─────┼────┼────┼────┼────┼────┤     │
│        │ F13 │F14 │ F15 │F16 │F17 │F18 │ F19 │F20 │F21 │F22 │F23 │F24 │     │
│        │ F13 │F14 │ F15 │F16 │F17 │F18 │ F19 │F20 │F21 │F22 │F23 │F24 │     │
│        │ Red │Pink│Green│Yelow│Blue│Turq│White│ ◗C │    │CrBnk│AltCr│+Cr │ │
│        ├─────┼────┼─────┼────┼────┼────┼─────┼────┼────┼────┼────┼────┤     │
│        │ F1  │F2  │ F3  │F4  │F5  │F6  │ F7  │F8  │F9  │F10 │F11 │F12 │     │
│        │ F1  │F2  │ F3  │F4  │F5  │F6  │ F7  │F8  │F9  │F10 │F11 │F12 │     │
│        │ PSA │PSB │ ◗P  │    │ ⓐ │◗T  │     │    │ ⓐ │>ā< │ a  │◗H  │    │ │
│  ExSel │     │    │     │    │    │    │ APL │    │    │    │    │    │     │
└─────────────────────────────────────────────────────────────────────────┘

┌──────┬──────┬──────────────────────────────┬──────┬──────┬──────┐
│ Attn │Clear │                         ←BS   │ Dup  │Fldmk │      │
│ Attn │Clear │                         ←BS   │ PA1  │PA2   │Jump  │
│ SysRq│      │                               │      │ChgSc │PA3   │
├──────┼──────┼──────────────────────────────┼──────┼──────┼──────┤
│ CrSel│Pause │ →│                            │  │←   │ â    │  ⤴   │
│ CrSel│Pause │ →│                      ↵     │  │←   │ â̂    │  ⤴   │
│      │ErInp │ →►│                      ↵     │      │      │ ааа  │
├──────┼──────┼──────────────────────────────┼──────┼──────┼──────┤
│ ExSel│ErEOF │ ⊕                            │      │  ↑   │      │
│ ExSel│ErEOF │ ⊕                            │      │  ↑   │      │
│ SetUp│Recrd │ ⊕                            │      │      │      │
├──────┼──────┼──────────────┬─────────────┬──────┼──────┼──────┤
│ Print│Copy  │ ⬦            │          ⬦  │  ←   │Rule  │  →   │
│ Print│Play  │ ⬦            │          ⬦  │  ←   │Rule  │  →   │
│ Ident│Test  │ ⬦            │          ⬦  │  ◄◄  │ ↖    │  ►►  │
├──────┼──────┼──────┬────────┼────────┬─────┼──────┼──────┼──────┤
│ ◗─□  │Ctrl  │Reset │  ALT   │  ALT   │Enter│  ↕   │      │      │
│ ◗─□  │Ctrl  │Reset │  ALT   │  ALT   │Enter│  ↕   │ Jump │      │
│ Help │      │Quit  │  ALT   │  ALT   │     │      │      │      │
└──────┴──────┴──────┴────────┴────────┴─────┴──────┴──────┴──────┘

 F3=Exit     F4=Change Operation   F5=Change Shift   F7=Backward   F8=Forward   F9=Reset
 ────────────────────────────────────────────────────────────────────────────────────
 SETUP      COPY    FULL
```
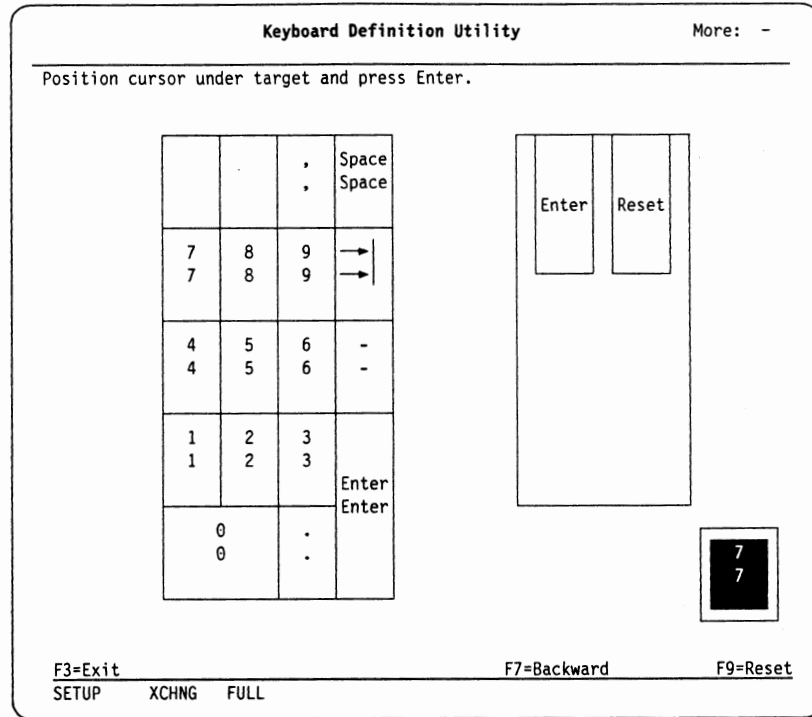
Figure   C-8. Target Panel No. 2

Figure C-8 shows the Target Panel No. 2. From this panel, you can:

- Specify a target key which you want to assign a function of an exchange, or copy source key that you selected in step 6 on page C-17

- Delete a control-function key.

┌─ **If your desired target key is not in this panel** ──────────────────────┐

- Go to Target Panel No. 3 (**keypad key** or **mouse button**), press the F8 key. Go to step 9 on page C-27.

- Go to Target Panel No. 1 (**alphanumeric, special,** or **diacritical character/mark**), press the F7 key. Go to step 5 on page C-15.

The source key you specified in the Source Panel No. 2 is displayed in **yellow** reverse at the bottom right of the panel.

An operation mode that you specified in the Source Panel No. 2, "XCHNG" (exchange), "COPY" (copy), or "DELET" (delete) is displayed in the operator information area.

A shift mode that you specified in the Source Panel No. 2, "FULL" or "PARTIAL", is displayed in the operator information area.

> **Before Operation**
>
> There are several sets of multiple-keys that must not be deleted. You must keep at least one key out of a set of multiple-keys on your keyboard. The following figure lists the multiple-keys. They are displayed in **green** on the panel.
>
> | | |
> |---|---|
> | Alt | SysRq |
> | Ctrl | Test |
> | Cursor move keys ($\uparrow \downarrow \leftarrow \rightarrow$) | Upshift |
> | Enter | カナ |
> | Reset | 英数 |
> | SetUp | 英数/ カナ |
> | Space | |

> **How to Cancel**
>
> To cancel the last setting you made in this panel, press the F9 key.

Proceed to the Source Panel No. 2 by pressing the F8 key.

Do the following:

a Specify a target key.

Move the Cursor to a target key and press the Enter key; the Source Panel No. 1 will appear.

> **If you completed your key definition**
>
> Press the F3 key to save your definition. For additional save details, see page C-29.

> **If you have more keys to be defined**
>
> Go to source selection for next source key. The present panel is the Source Panel No. 1. For source selection details, see page C-17.

8 Source Selection (Keypad Key or Mouse Button)

```
┌─────────────────────────────────────────────────────────────────────┐
│                      Keyboard Definition Utility          More: -     │
├───────────────────────────────────────────────────────────────────────
│ Position cursor under source and press Enter.                         │
│                                                                       │
│            ┌────┬────┬────┬──────┐      ┌──────┬──────┐                │
│            │    │    │  , │Space │      │      │      │                │
│            │    │    │  , │Space │      │Enter │Reset │                │
│            ├────┼────┼────┼──────┤      │      │      │                │
│            │  7 │  8 │  9 │ →│   │      │      │      │                │
│            │  7 │  8 │  9 │ →│   │      │      │      │                │
│            ├────┼────┼────┼──────┤      └──────┴──────┘                │
│            │  4 │  5 │  6 │  -   │                                     │
│            │  4 │  5 │  6 │  -   │                                     │
│            ├────┼────┼────┼──────┤                                     │
│            │  1 │  2 │  3 │      │                                     │
│            │  1 │  2 │  3 │      │                                     │
│            │    │    │    │Enter │                                     │
│            ├────┴────┼────┤Enter │                                     │
│            │    0    │  . │      │                                     │
│            │    0    │  . │      │                                     │
│            └─────────┴────┴──────┘                                     │
│                                                                       │
│ F3=Exit  F4=Change Operation  F5=Change Shift  F7=Backward   F9=Reset │
│ SETUP    XCHNG    FULL                                                │
└───────────────────────────────────────────────────────────────────────┘
```

Figure C-9. Target Panel No. 3

Note: The mouse buttons cannot be selected in full shift mode.

Figure C-9 shows the Source Panel No. 3. From this panel, you can:

- Select a keypad key or mouse button to be used as a copy or exchange source.

┌─── **If your desired source key is not in this panel** ─────────────────┐
│   │
│ Go to Source Panel No. 2 (**control-function key**); press the F7 key. Go to │
│ step 7 on page C-21.   │
│   │
└───┘

┌─── **How to Cancel** ───┐
│   │
│ To cancel a setting you made latest in this panel, press the F9 key.   │
│   │
└───┘

To return to the Source Panel No. 2, press the F7 key.

Do the following.

a Specify a type of operation.

By pressing the F4 key repeatedly, "XCHNG" (exchange), "COPY" (copy), and "DELET" (delete) are displayed in sequence in the operator information area.

When Delete ─────────────────────────────

- When you select "DELET" (delete) the panel changes to the
  Target Panel No. 3, and then do the following:

  - If your delete target key is displayed in **reverse** video on the
    panel, the F5 key to select "FULL" for a shift mode.

  - With regard to the other key, go to **b** of step 4b on
    page C-12.

  - Press the F4 key repeatedly to select "DELET" for a type of
    operation; the Target Panel No. 1 will appear. Go to step 9
    on page C-27.

When Exchange ─────────────────────────────

The Typematic, Make-only, and Make/Break keys have exchange
restrictions on them. The following summarizes these restrictions.

Note: "possible" indicates no restrictions on exchanging the keys.

		Target		
		Typematic Key	Make-only Key	Make/Break Key
S o u r c e	Typematic Key	Possible	Possible but Not recommended	Impossible
	Make-only Key	Possible but Not recommended	Possible	Impossible
	Make/Break Key	Impossible	Impossible	Possible only in FULL mode

---

When Copy ────────────────────────────

The Typematic, Make-only, and Make/Break keys have copying restrictions on them. The following summarizes these restrictions.

Note: "possible" indicates no restrictions on copying the keys.

		Target		
		Typematic Key	Make-only Key	Make/Break Key
S o u r c e	Typematic Key	Possible	Possible but Not recommended	Impossible
	Make-only Key	Possible but Not recommended	Possible	Impossible
	Make/Break Key	Impossible	Impossible	Possible only in FULL mode
	I/O Interface Code Table	Possible only if the target is an alpha-numeric or special character key except keypad key	Impossible	Impossible

b Specify a shift mode.

If you repeatedly press the F5 key, "FULL" and "PARTIAL" are displayed in the operator information area in a flip-flop manner. FULL specifies that all the functions of a key in the upper shift, lower shift, and alt shift positions have been selected to be an exchange or copy source. PARTIAL specifies that one of the functions of a key in the upper shift, lower shift, alt shift, exsel shift, and alt-up shift (on the Enhanced keyboard) positions is selected to be an exchange or copy source. The following figure illustrates respective functions of a key in upper shift, lower shift, and alt shift positions.

Keyapd Key	Mouse Button
Upper shift ⟶ 7 Lower shift ⟶ 7 Alt shift ⟶	Lower shift ⟶ Enter

---

Keys that cannot be specified in PARTIAL mode

You must specify "FULL" if you select one of the following keys. They are displayed in **reverse** video on the panel to indicate such keys. The keys that can be copy or exchange targets on the target panel are also displayed in **reverse** video.

Alpha symbols (英記号)	Kana symbols (カナ記号)
英数	Katakana (カナ)
Alt	**英数/カナ**
Ctrl	Latin
Cursor move keys (↑ ↓ ← →)	Reset/Quit
Cyrillic	Shift Lock
Enter	Upshift
Greek	Caps Lock

---

c To make a function of a keypad key (for example, "7") an exchange or copy source:

Move the Cursor to "7" as shown in the following figure and press the Enter key. The Target Panel No. 3 will appear. Go to step 9 on page C-27.

9 Target Selection (Keypad Key or Mouse Button)

```
┌────────────────────────────────────────────────────────────────────┐
│                    Keyboard Definition Utility          More:  -     │
│────────────────────────────────────────────────────────────────────│
│ Position cursor under target and press Enter.                        │
│                                                                      │
│      ┌────┬────┬────┬──────┐    ┌─────────────────┐                  │
│      │    .│   ,│Space│           │      │     │    │                  │
│      │     │   ,│Space│         │ │Enter│ │Reset│  │                  │
│      ├────┼────┼────┼──────┤    │ │     │ │     │  │                  │
│      │  7 │  8 │  9 │ →│   │    │ │     │ │     │  │                  │
│      │  7 │  8 │  9 │ →│   │    │ └─────┘ └─────┘  │                  │
│      ├────┼────┼────┼──────┤    │                  │                  │
│      │  4 │  5 │  6 │  -   │    │                  │                  │
│      │  4 │  5 │  6 │  -   │    │                  │                  │
│      ├────┼────┼────┼──────┤    │                  │                  │
│      │  1 │  2 │  3 │      │    │                  │                  │
│      │  1 │  2 │  3 │Enter │    │                  │                  │
│      ├────┴────┼────┤Enter │    └─────────────────┘                  │
│      │    0    │  . │      │                                         │
│      │    0    │  . │      │                           ┌────┐         │
│      └─────────┴────┴──────┘                           │  7 │         │
│                                                        │  7 │         │
│                                                        └────┘         │
│                                                                      │
│ F3=Exit                              F7=Backward         F9=Reset     │
│ SETUP     XCHNG    FULL                                               │
└────────────────────────────────────────────────────────────────────┘
```

Figure   C-10. Target Panel No. 3

Figure C-10 shows the Target Panel No. 3. From this panel, you can:

- Specify a target key which you want to assign a function of an exchange or copy source key that you selected in step 8 on page C-23

- Delete a function of a key.

┌─ **If your desired target key is not in this panel** ────────────────┐
│   │
│ Go to Target Panel No. 2 (**control-function key**); press the F7 key. Go to │
│ step 7 on page C-21.   │
│   │
└──┘

The source key you specified in the Source Panel No. 3 is displayed in **yellow** reverse at the bottom right of the panel.

An operation mode that you specified in the Source Panel No. 3, "XCHNG" (exchange), "COPY" (copy), or "DELET" (delete) is displayed in the operator information area.

A shift mode that you specified in the Source Panel No. 3, "FULL" or "PARTIAL" is displayed in the operator information area.

Before Operation

There are several sets of multiple-keys that must not be deleted. You must keep at least one key out of a set of multiple-keys on your keyboard. The following figure lists the multiple-keys. They are displayed in **green** on the panel.

Alt	SysRq
Ctrl	Test
Cursor move keys (↑ ↓ ← →)	Upshift
Enter	カナ
Reset	英数
SetUp	英数/ カナ
Space	

How to Cancel

To cancel the last setting you made in this panel, press the F9 key.

Do the following:

a Specify a target key.

Move the Cursor to a target key and press the Enter key; the Source Panel No. 3 will appear.

If you completed your key definition

Press the F3 key to save your definition. For additional save details, see page C-29.

If you have more keys to be defined

Go to source selection for next source key. The present panel is the Source Panel No. 3. For source selection details, see page C-23.

---

10 Save Operation

```
┌─────────────────────────────────────────────────────────────────────┐
│                      Keyboard Definition Utility                      │
│ ───────────────────────────────────────────────────────────────────── │
│ Move cursor to desired choice, and press SPACE BAR to select.          │
│                                                                        │
│                                                                        │
│    Save changes  . . . . . .   ▐Yes▌      No                          │
│                                                                        │
│    Keyboard layout . . . . .   User1    User2    User3                │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                 .                                      │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│ F3=Exit                                                                │
│ ───────────────────────────────────────────────────────────────────── │
│ SETUP     SAVE                                                         │
└─────────────────────────────────────────────────────────────────────┘
```

Figure   C-11. Save Panel

Figure C-11 shows the Save Panel. From this panel, you can:

- Save your keyboard layout definition

- Cancel your keyboard layout definition

- Save up to three kinds of keyboard layout definition.

Do the following:

a Save or Cancel

   Move the Cursor to "Yes" or "No". Selecting "Yes" saves your key-
   board definition. Selecting "No" cancels your keyboard layout defi-
   nition. Press the Space Bar to make your selection. Your selection will
   be displayed in reverse video.

b Specify the table name

   You need to select a table name from "User1", "User2", and "User3".
   It is a name to be assigned to a table where information on your key-
   board layout definition is saved. Move the Cursor to the desired table
   name. Press the Space Bar to make your selection.

   Notes:

   1) If the content of a table has been modified and saved, the table
      name is displayed in **pink** on the panel.

   2) When the name of a table in the Main Panel is the same as the
      name of a table in the Save Panel, the contents of the table will be
      updated as a result of the save operation.

c Press the F3 key to exit.

Notes:

- If you selected "Yes", a message, "All changes will be saved, press Enter to continue or any other key to quit." appears at the bottom of the panel.

  - Pressing the Enter key starts the uploading of the modified content of your specified table to the 3174 or 937X. The Main Panel will be displayed after the uploading is completed.

  - Pressing any other key cancels your save request and lets you stay in the Save Panel.

- If you selected "No", a message, "All changes will be canceled, press Enter to continue or any other key to quit." appears at the bottom of the panel.

  - Pressing the Enter key lets you return to the Main Panel without saving.

  - Pressing any other key cancels your non-save request and lets you stay in the Save Panel.

```
┌──────────────────────────────────────────────────────────────────┐
│                    Keyboard Definition Utility                     │
│ ──────────────────────────────────────────────────────────────── │
│ Position cursor under source and press Enter.                      │
│                                                                    │
│                                          Diacritical-mark keys     │
│                                                                    │
│                                                    ´               │
│                                                    `               │
│                                                    ^               │
│                                                    ..              │
│                                                    -               │
│                                                    °               │
│                                                    ˛               │
│                                              ┌─────────────┐       │
│                                              │ 456789ABCDEF│       │
│  ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐ 0 │..........0 │      │
│  │~ │| │@ │# │$ │% │¬ │& │* │( │) │_ │+ │  │ 1 │....aj..AJ.1│      │
│  │` │1 │2 │3 │4 │5 │6 │7 │8 │9 │0 │- │= │  │ 2 │....bks.BKS2│      │
│  └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘ 3 │....clt.CLT3│      │
│    ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐ 4 │....dmu.DMU4 │      │
│    │Q │W │E │R │T │Y │U │I │O │P │! │] │  5 │....env.ENV5 │       │
│    │q │w │e │r │t │y │u │i │o │p │█ │\ │  6 │....fov.FOW6 │       │
│    └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘  7 │....gpx.GPX7 │        │
│      ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐ 8 │....hqy.HQY8 │      │
│      │A │S │D │F │G │H │J │K │L │: │" │} │ 9 │....irz.IRZ9 │      │
│      │a │s │d │f │g │h │j │k │l │; │' │{ │ A │............ │      │
│      └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘ B │............ │      │
│        ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐  C │............ │       │
│        │> │Z │X │C │V │B │N │M │, │. │? │  D │............ │       │
│        │< │z │x │c │v │b │n │m │, │. │/ │  E │............ │       │
│        └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘  F │............ │       │
│              ┌────────────────┐                                    │
│              │     Space      │                                    │
│              │     Space      │                                    │
│              │     Space      │                                    │
│              └────────────────┘                                    │
│                                                                    │
│ F3=Exit                                              F9=Reset      │
│ SETUP     COPY     PARTIAL                                         │
└──────────────────────────────────────────────────────────────────┘
```
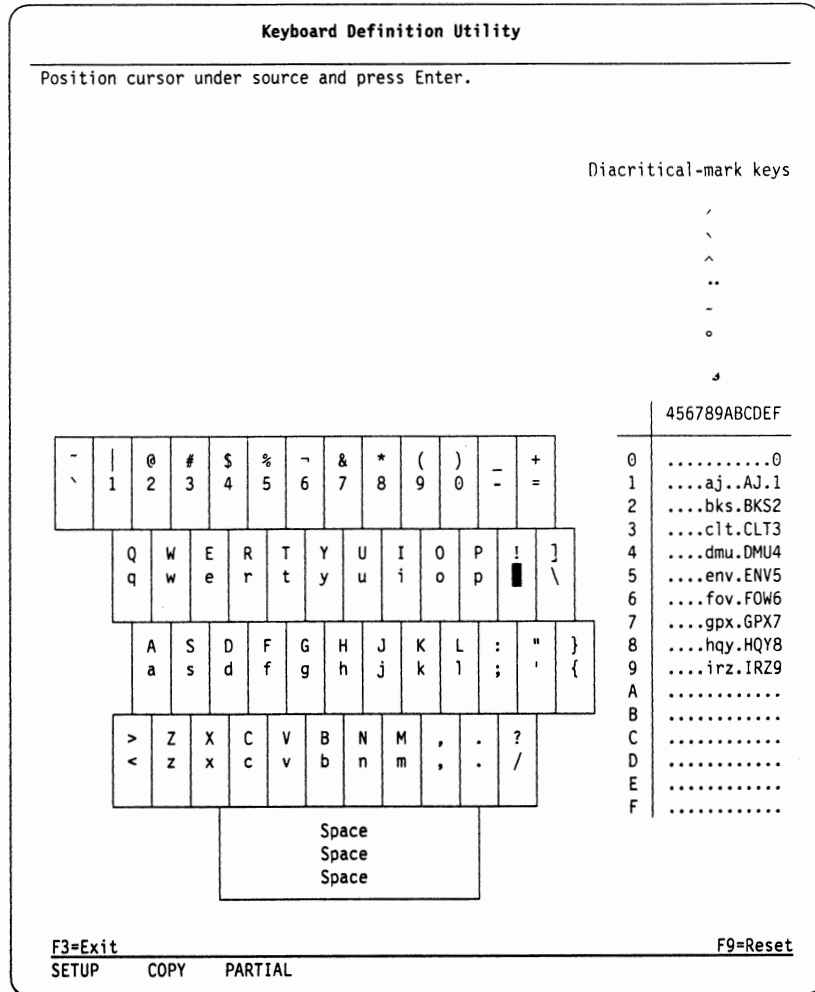
Figure C-12. Source Panel No. 1

Figure C-12 shows the Source Panel No. 1. From this panel, you can:

- Select a diacritical mark (for example, ´) from the diacritical-mark keys table (near the upper right of the panel) to be used as a copy source.

  Notes:

  a. Diacritical marks that you select from the diacritical-mark keys table can be used as dead keys. For how to use dead keys, see Diacritical Mark Key on page 4-9.

  b. A diacritical mark that you selected from the diacritical-mark keys table is displayed in **white** on the target panel after specifying the copy target key.

- Select an alphanumeric, special, or diacritical character (for example, Ä) from the I/O interface code table (near the bottom right of the panel) to be used as a copy source.

Notes:

  a. Special characters may also be referred to as alpha symbols.

  b. Although you can select diacritical marks from the I/O interface code table, they do not function as dead keys.

┌─ **If your desired source key is not in this panel** ─────────────────────────┐

Press the F8 key; the Source Panel No. 2 (control-function key) will appear; Skip the following to go to step {LIST13}.

└──┘

┌─ **How to Cancel** ───┐

To cancel the last setting you made in this panel, press the F9 key.

└──┘

Do the following.

a To select a diacritical mark from the diacritical-mark keys table:

Move the Cursor to "°" in the table; press the Enter key. The Target Panel No. 1 will appear. Go to step 12 on page C-33.

```
Diacritical-mark keys
                /
                `
                ^
                ..
                -
                °
                ʤ
```

b To make a diacritical character (for example, Ä) a copy source:

Move the Cursor to "Ä" as shown in the following figure and press the Enter key. The Target Panel No. 1 will appear. Go to step 12 on page C-33.

```
       | 456789ABCDEF
  -----+-------------
    0  | ............
    1  | ............
    2  | ............
    3  | ..Ä.........
    4  | ............
    5  | ............
    6  | ............
    7  | ............
    8  | ............
    9  | ............
    A  | ............
    B  | ............
    C  | ............
    D  | ............
    E  | ............
    F  | ............
```

12 Target Selection (Alphanumeric, Special, or Diacritical Character/Mark)

```
┌──────────────────────────────────────────────────────────────────────────┐
│                         Keyboard Definition Utility                        │
│ ──────────────────────────────────────────────────────────────────────────│
│ Position cursor under target and press Enter.                              │
│                                                                            │
│                                                                            │
│                                              Diacritical-mark keys         │
│                                                                            │
│                                                        ´                   │
│                                                        `                   │
│                                                        ^                   │
│                                                        ¨                   │
│                                                        ‾                   │
│                                                        °                   │
│                                                                            │
│                                                        ̦                    │
│                                                     ┌──────────────        │
│                                                     │ 456789ABCDEF         │
│  ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐        0 │ ...........0         │
│  │~ │! │@ │# │$ │% │¬ │& │* │( │) │_ │+ │        1 │ ....aj..AJ.1         │
│  │` │1 │2 │3 │4 │5 │6 │7 │8 │9 │0 │- │= │        2 │ ....bks.BKS2         │
│  └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘        3 │ ....clt.CLT3         │
│       ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐      4 │ ....dmu.DMU4         │
│       │Q │W │E │R │T │Y │U │I │O │P │! │] │      5 │ ....env.ENV5         │
│       │q │w │e │r │t │y │u │i │o │p │█ │\ │      6 │ ....fov.FOW6         │
│       └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘      7 │ ....gpx.GPX7         │
│        ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐     8 │ ....hqy.HQY8         │
│        │A │S │D │F │G │H │J │K │L │: │" │} │     9 │ ....irz.IRZ9         │
│        │a │s │d │f │g │h │j │k │l │; │' │{ │     A │ ............         │
│        └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘     B │ ............         │
│         ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐       C │ ............         │
│         │> │Z │X │C │V │B │N │M │, │. │? │       D │ ............         │
│         │< │z │x │c │v │b │n │m │, │. │/ │       E │ ............         │
│         └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘       F │ ............         │
│                  ┌──────────────┐                                          │
│                  │     Space    │                                          │
│                  │     Space    │                                          │
│                  │     Space    │                                          │
│                  └──────────────┘                                          │
│                                                                            │
│ F3=Exit                                                           F9=Reset │
│ ───────────────────────────────────────────────────────────────────────── │
│ SETUP     COPY     PARTIAL                                                  │
└──────────────────────────────────────────────────────────────────────────┘
```

Figure   C-13. Target Panel No. 1

ˋFigure C-13 shows the Target Panel No. 1. From this panel, you can:

- Specify a target key to which you want to assign an alphanumeric, special, diacritical character, or diacritical mark that you selected in step 11 on page C-31 as a copy source.

┌─ **Space** ──┐
│   │
│ You must keep at least one Space.   │
│   │
└───┘

┌─ **How to Cancel** ──┐
│   │
│ To cancel the last setting you made in this panel, press the F9 key.   │
│   │
└───┘

13 Save Operation

```
┌─────────────────────────────────────────────────────────────────────┐
│                    Keyboard Definition Utility                        │
│ ───────────────────────────────────────────────────────────────────  │
│ Move cursor to desired choice, and press SPACE BAR to select.         │
│                                                                       │
│   Save changes  . . . . . .    Yes        No                          │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│  F3=Exit                                                              │
│ ───────────────────────────────────────────────────────────────────  │
│  SETUP     SAVE                                                       │
└─────────────────────────────────────────────────────────────────────┘
```
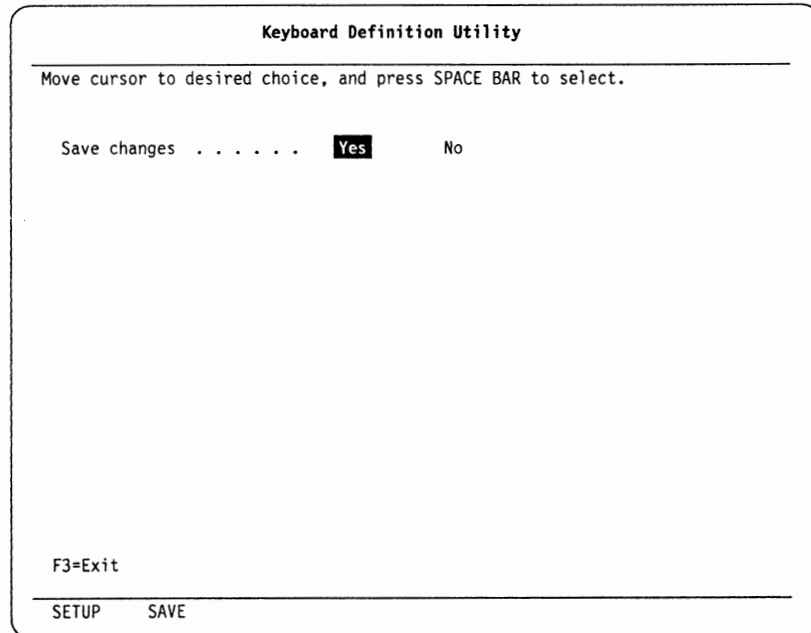
Figure C-14. Save Panel

Figure C-14 shows the Save Panel. From this panel, you can:

- Save your keyboard layout definition

- Cancel your keyboard layout definition.

Do the following.

a Save or Cancel

Move the Cursor to "Yes" or "No". Selecting "Yes" saves your keyboard definition. Selecting "No" cancels your keyboard layout definition. Press the Space Bar to make your selection. Your selection will be displayed in reverse video.

b Specify the table name

You need to select a table name from "User1", "User2", and "User3". It is a name to be assigned to a table where information on your keyboard layout definition is saved. Move the Cursor to the desired table name. Press the Space Bar to make your selection.

Notes:

1) If the content of a table has been modified and saved, the table name is displayed in **pink** on the panel.

2) When the name of a table in the Main Panel is the same as the name of a table in the Save Panel, the contents of the table will be updated as a result of the save operation.

C Press the F3 key to exit.

Notes:

- If you selected "Yes", a message, "All changes will be saved, press Enter to continue or any other key to quit." appears at the bottom of the panel.

  - Pressing the Enter key starts the uploading of the modified content of your specified table to the 3174 or 937X. The Main Panel will be displayed after the uploading is completed.

  - Pressing any other key cancels your save request and lets you stay in the Save Panel.

- If you had selected "No", a message, "All changes will be canceled, press Enter to continue or any other key to quit." appears at the bottom of the panel.

  - Pressing the Enter key lets you return to the Main Panel without saving.

  - Pressing any other key cancels your non-save request and lets you stay in the Save Panel.

Setup Sheet
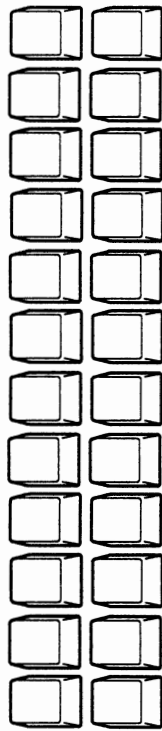
Numeric Lock ☐ On ☐ Off
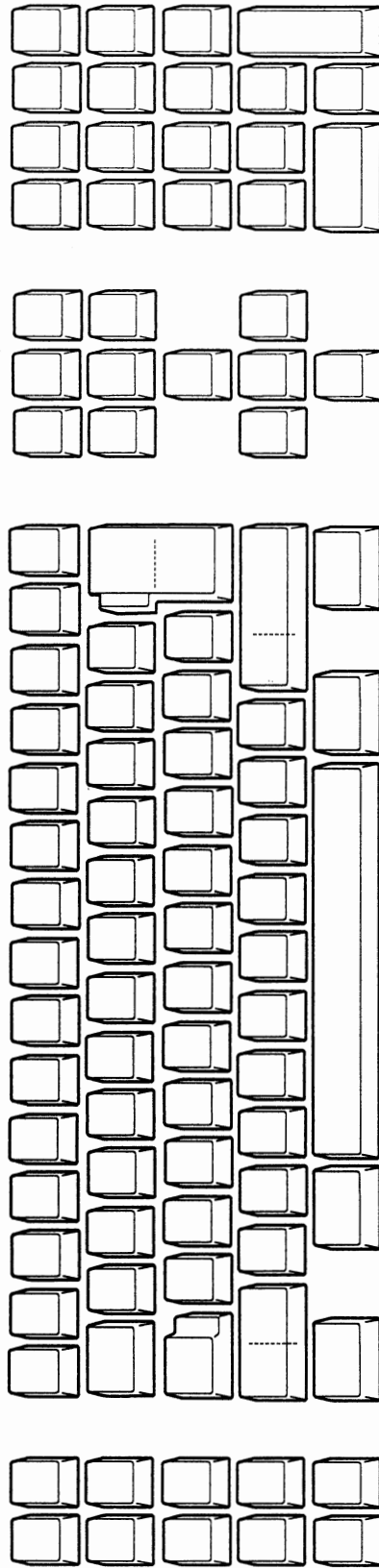
Screen Rows x Columns (3472 only):

Keyboard Layout (Type):

To the supervisor:

1. Make a copy of this sheet before you fill it out. Make one copy for each display station that you will install.
2. Fill in the appropriate setup value settings.
3. Fill in the keys that you are going to change. (if applicable)
4. Give each completed sheet to the person who will setup the display station.

Setup Sheet

Numeric Lock   ☐ On   ☐ Off
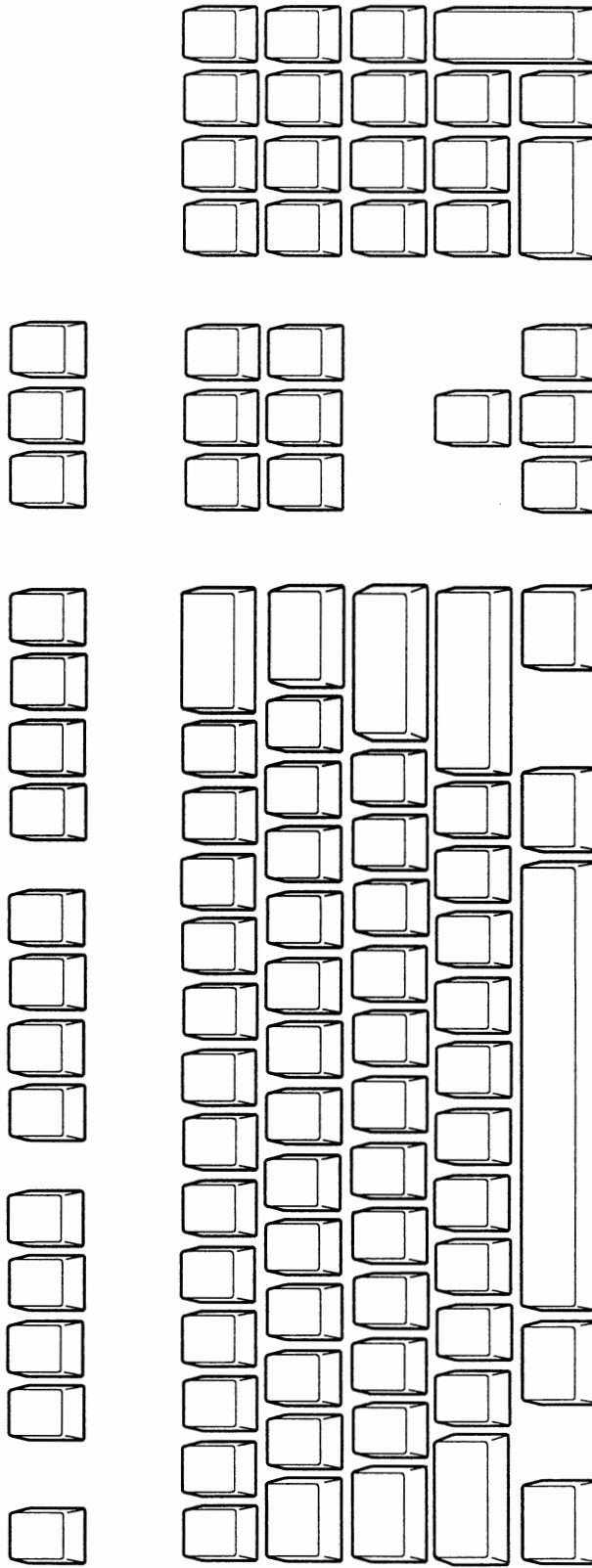
Screen Rows x Columns (3472 only): _____

Keyboard Layout (Type): _____

To the supervisor:

1. Make a copy of this sheet before you fill it out. Make one copy for each display station that you will install.
2. Fill in the appropriate setup value settings.
3. Fill in the keys that you are going to change. (if applicable)
4. Give each completed sheet to the person who will setup the display station.

Appendix D. Keyboard Layouts

This section shows the keyboard layouts for each country. The table shown below is a quick index for each keyboard layout.

Figure   D-1. Austrian/German 122-key Keyboard
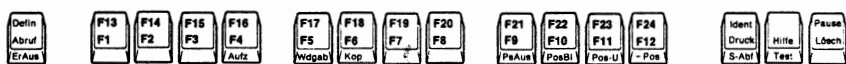
Figure   D-2. Austrian/German IBM Enhanced Keyboard
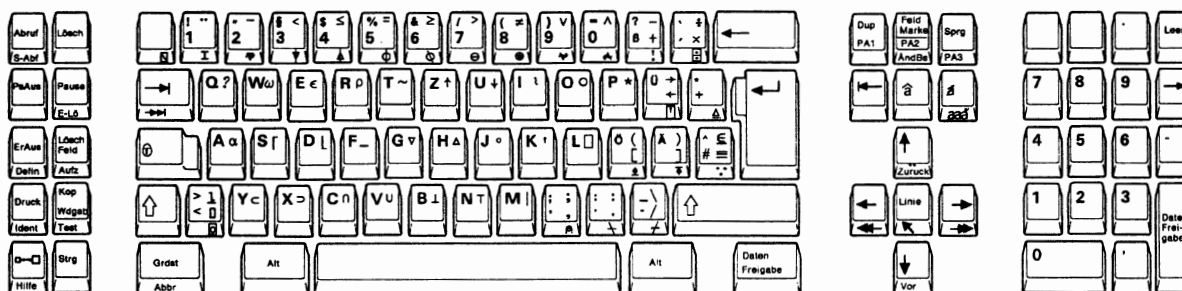
Figure   D-3. Austrian/German APL Keyboard
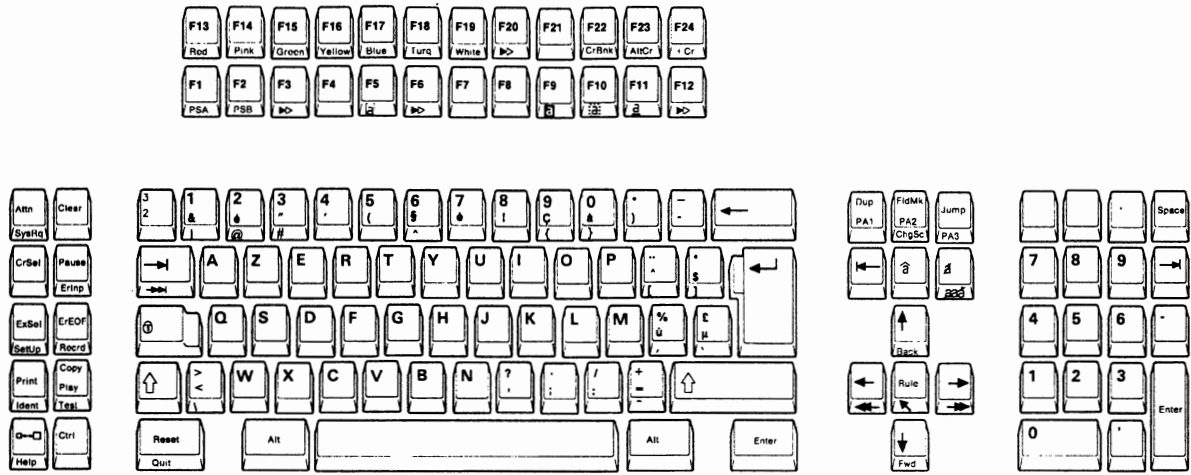
Figure D-4. Belgian 122-key Keyboard
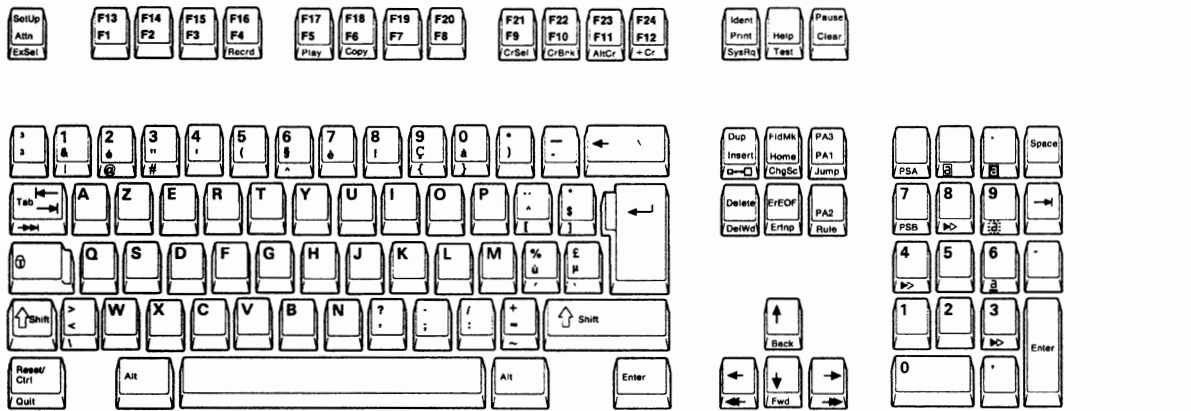
Figure D-5. Belgian IBM Enhanced Keyboard
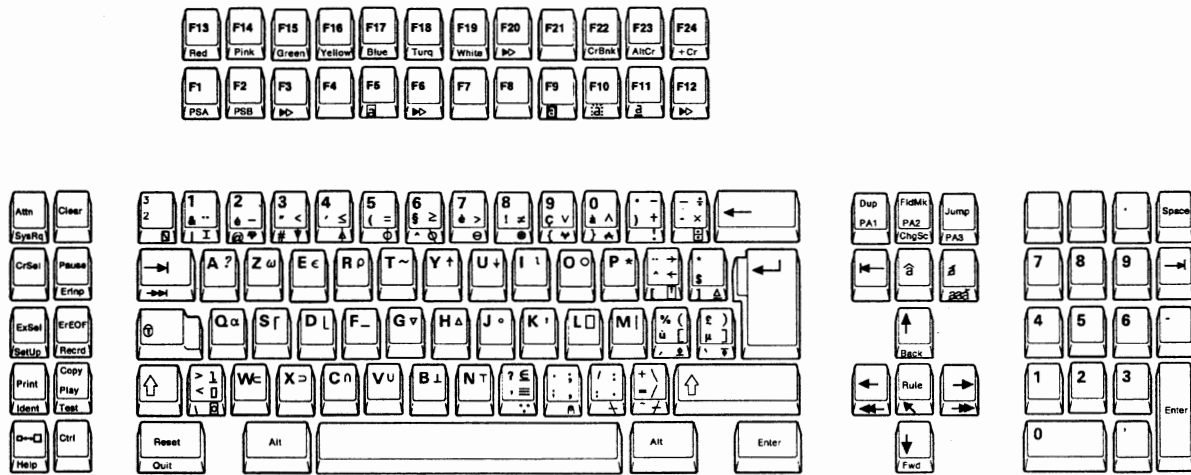
Figure D-6. Belgian APL Keyboard
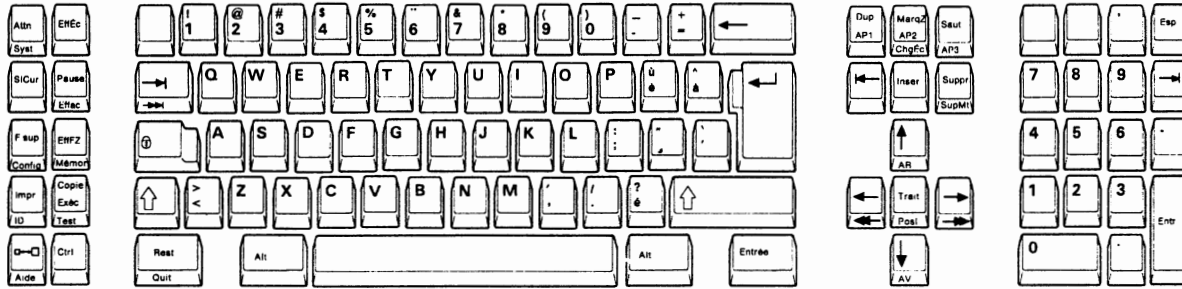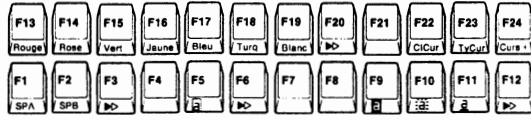
Figure D-7. Canadian-Bilingual 122-key Keyboard
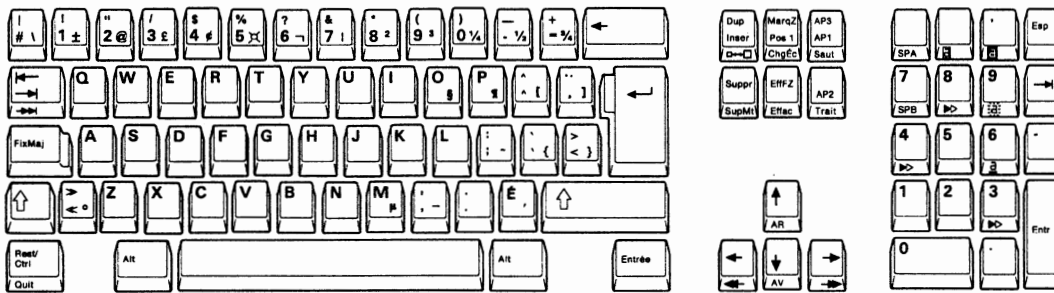
Figure D-8. Canadian-Bilingual IBM Enhanced Keyboard
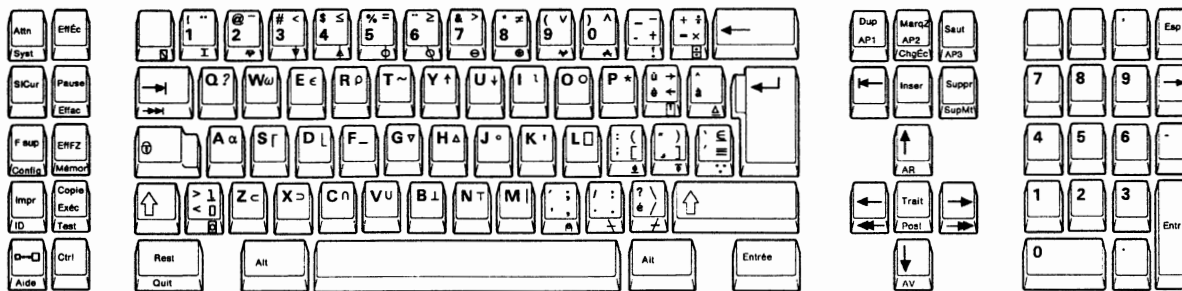
Figure D-9. Canadian-Bilingual APL Keyboard
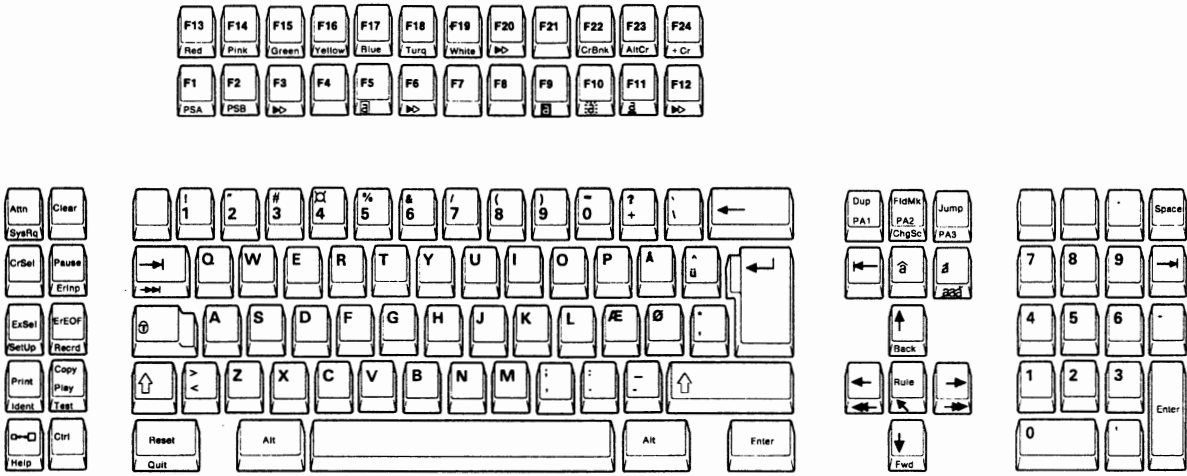
Figure   D-10. Danish 122-key Keyboard
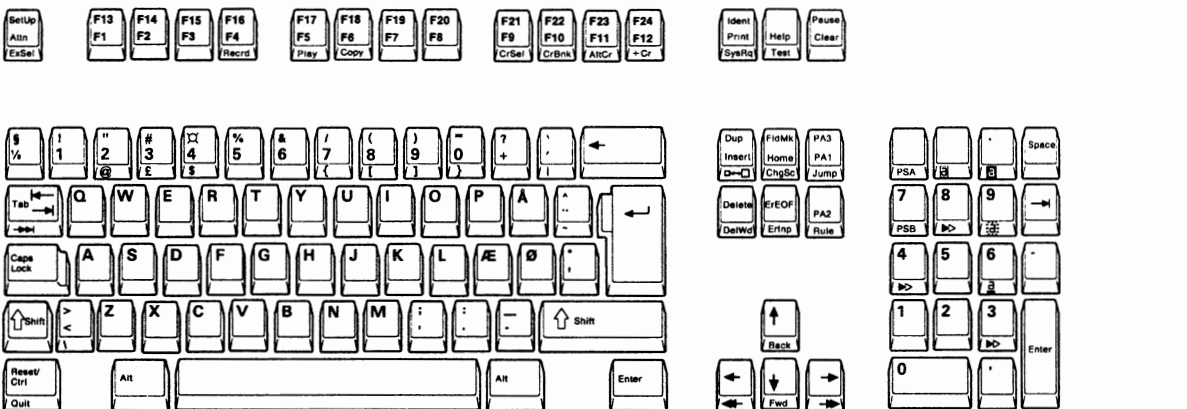
Figure   D-11. Danish IBM Enhanced Keyboard
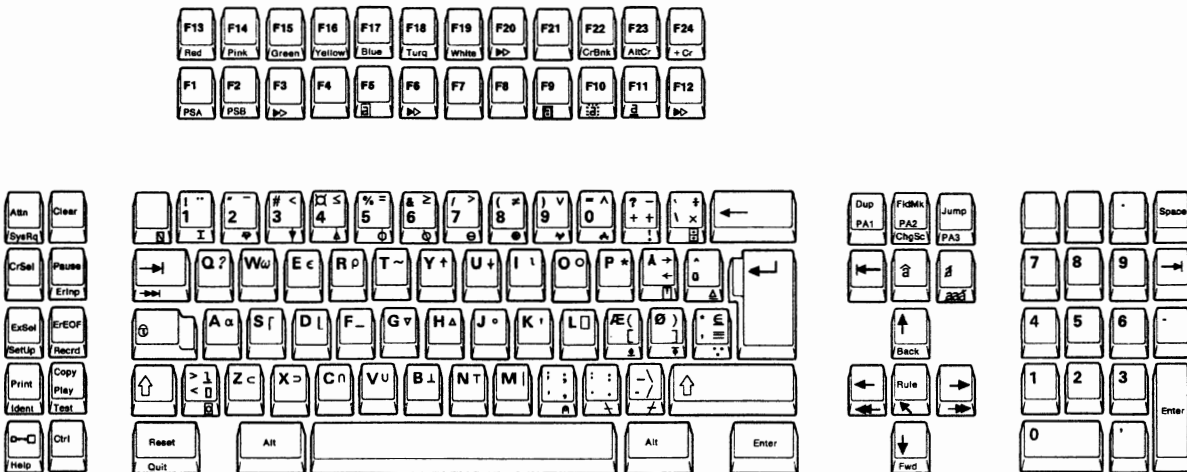
Figure   D-12. Danish APL Keyboard
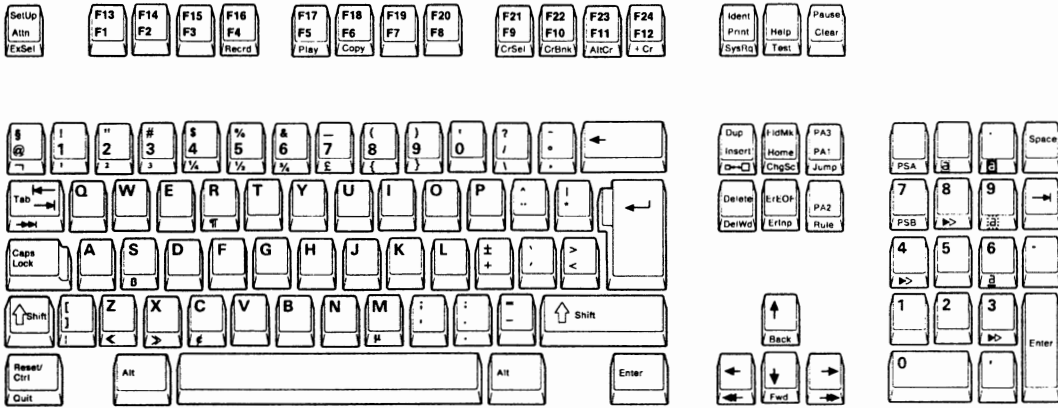
Figure   D-13. Dutch IBM Enhanced Keyboard
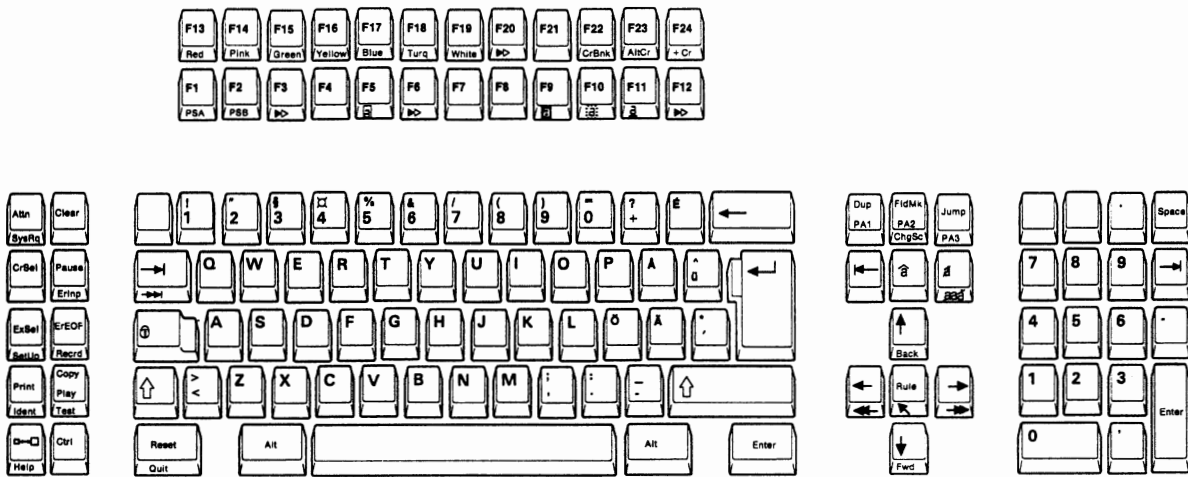
Figure   D-14. Finnish/Swedish 122-key Keyboard
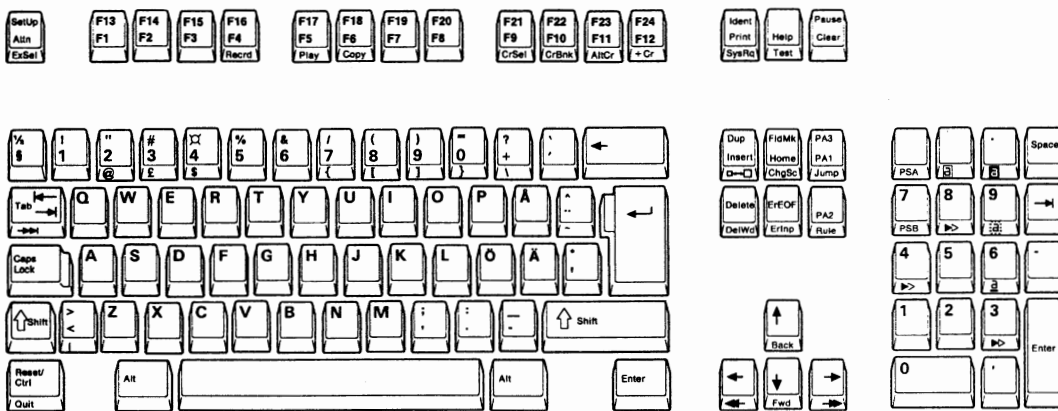
Figure   D-15. Finnish/Swedish IBM Enhanced Keyboard

Figure   D-16.   Finnish/Swedish APL Keyboard

Figure   D-17.   French AZERTY 122-key Keyboard

Figure   D-18.   French AZERTY IBM Enhanced Keyboard
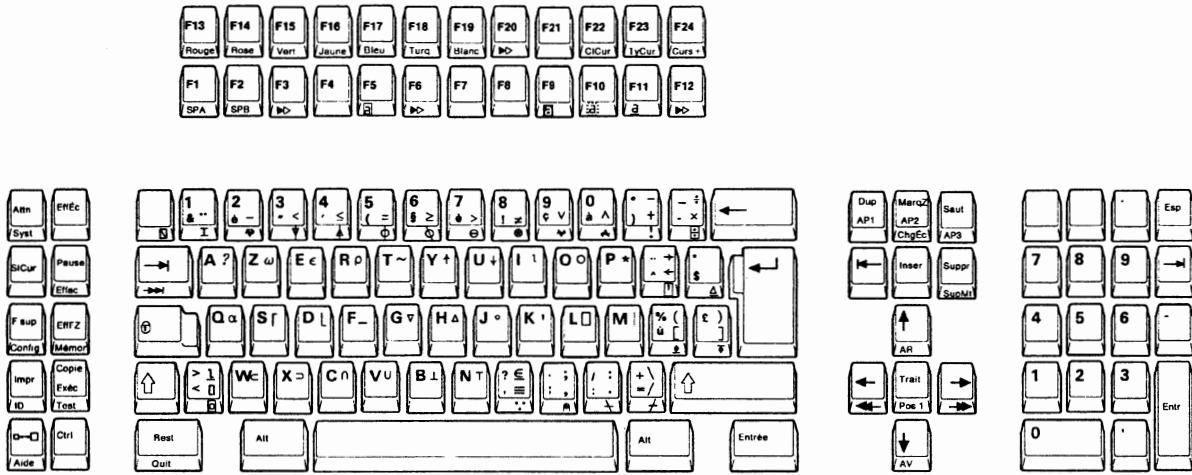
Figure D-19. French AZERTY APL Keyboard
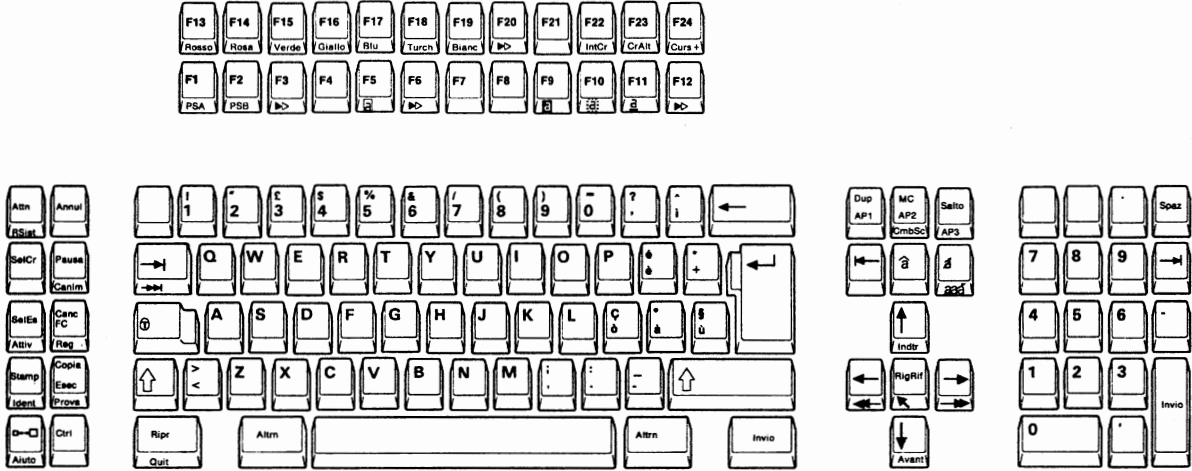
Figure D-20. Italian 122-key Keyboard
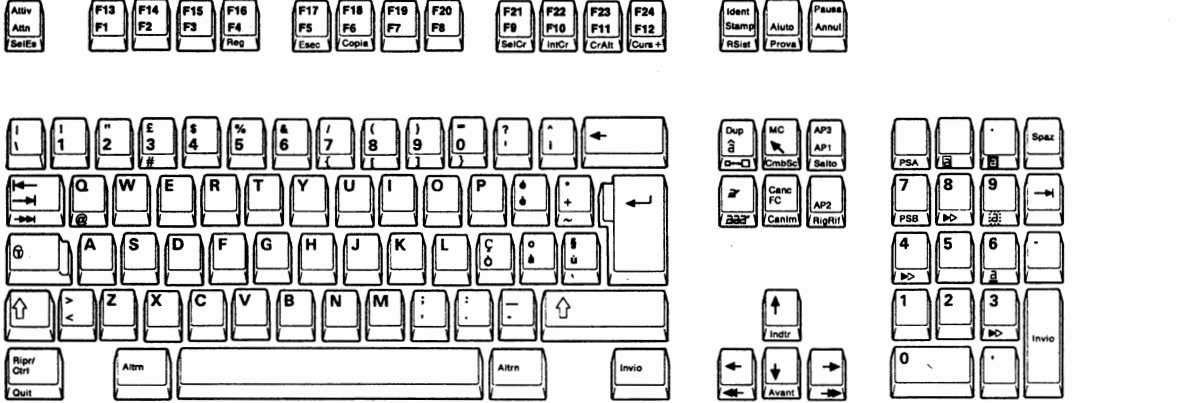
Figure D-21. Italian IBM Enhanced Keyboard
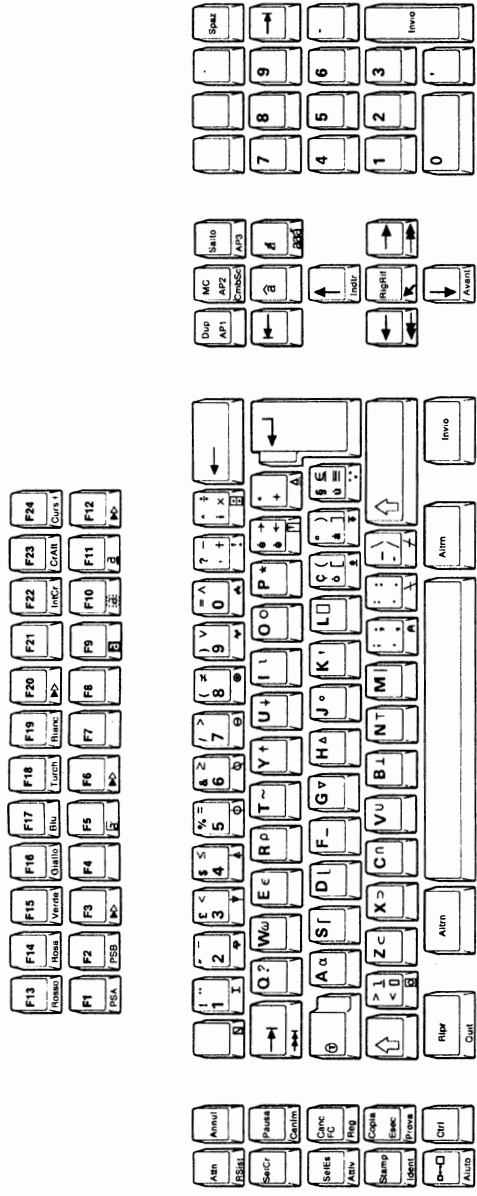
Figure D-22. Italian APL Keyboard
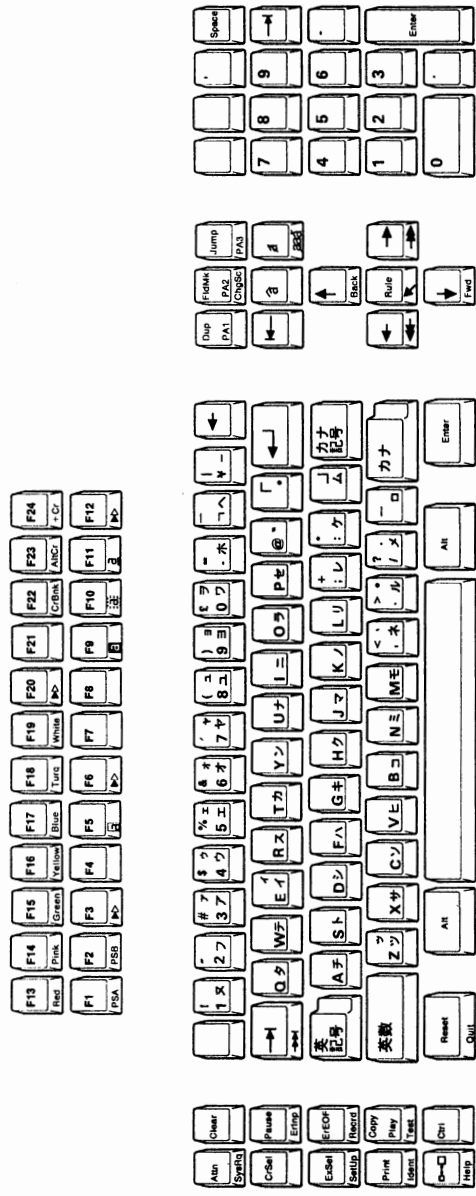
Figure D-23. Japanese Katakana 124-key Keyboard
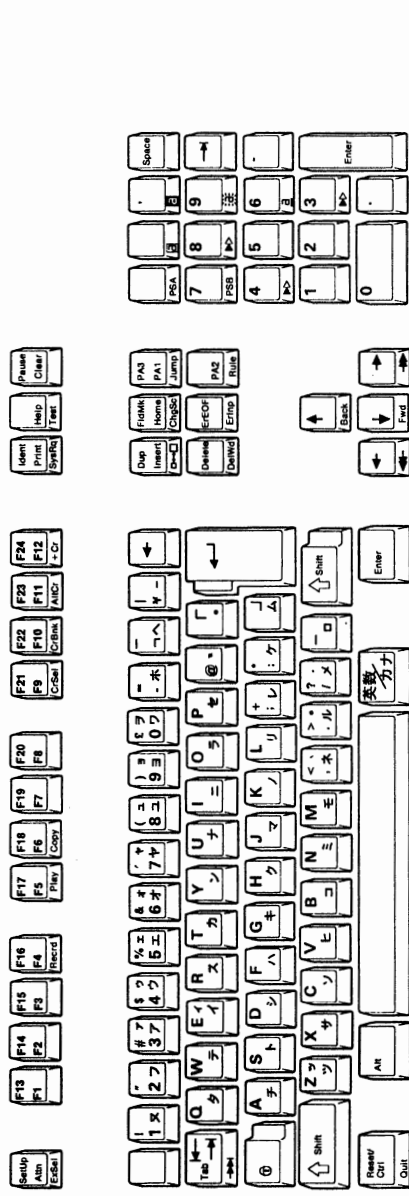
Figure D-24. Japanese Katakana IBM Enhanced Keyboard
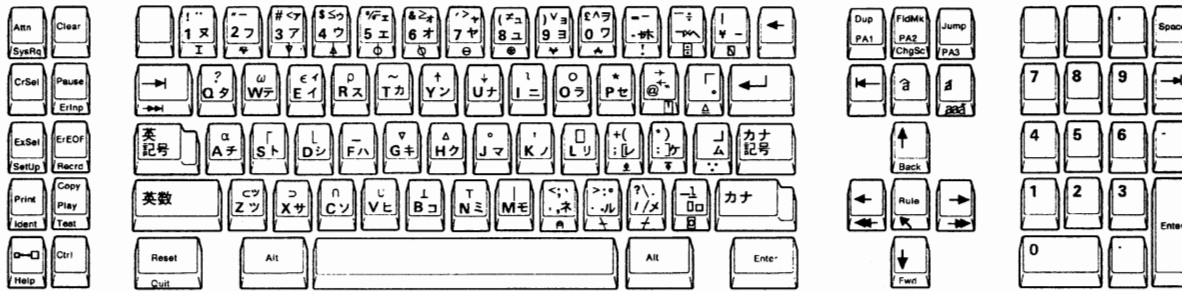
Figure D-25. Japanese Katakana APL Keyboard
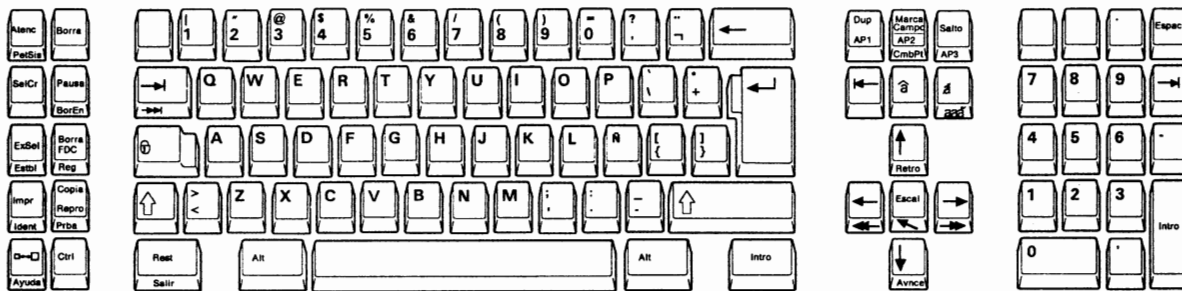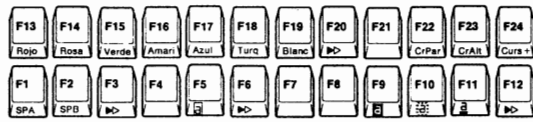
Figure D-26. Latin American Spanish 122-key Keyboard
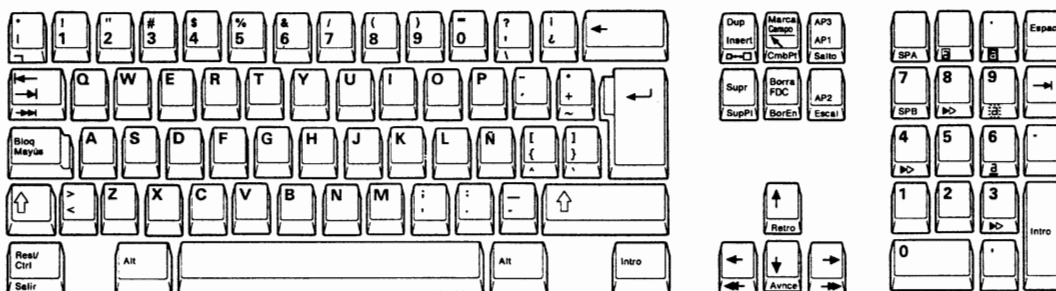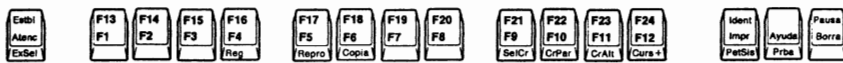
Figure D-27. Latin American Spanish IBM Enhanced Keyboard
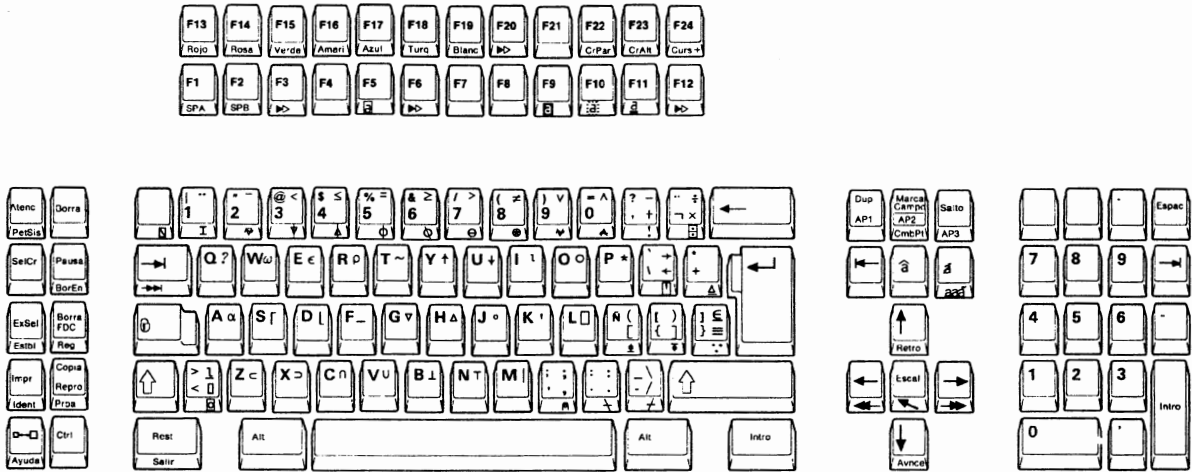
Figure   D-28. Latin American Spanish APL Keyboard
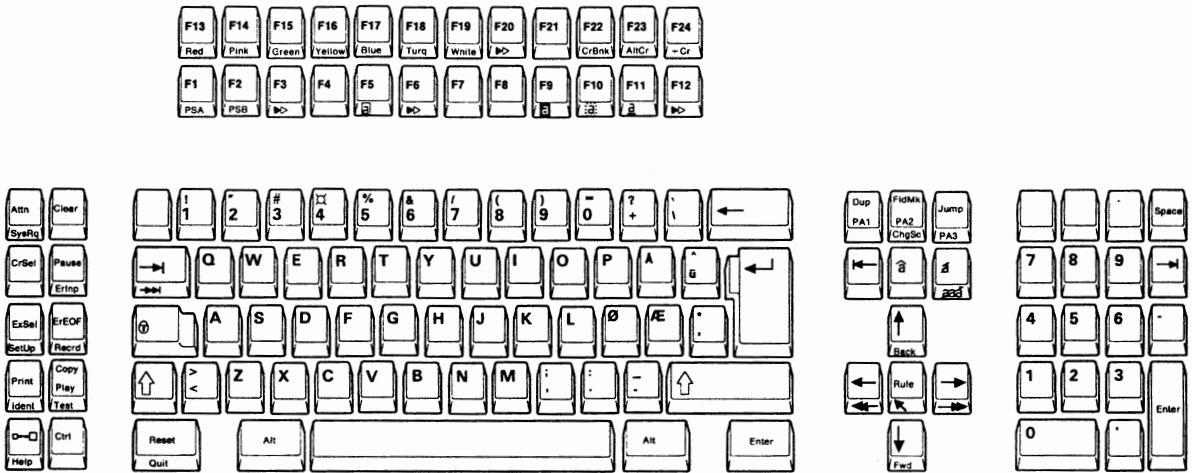
Figure   D-29. Norwegian 122-key Keyboard
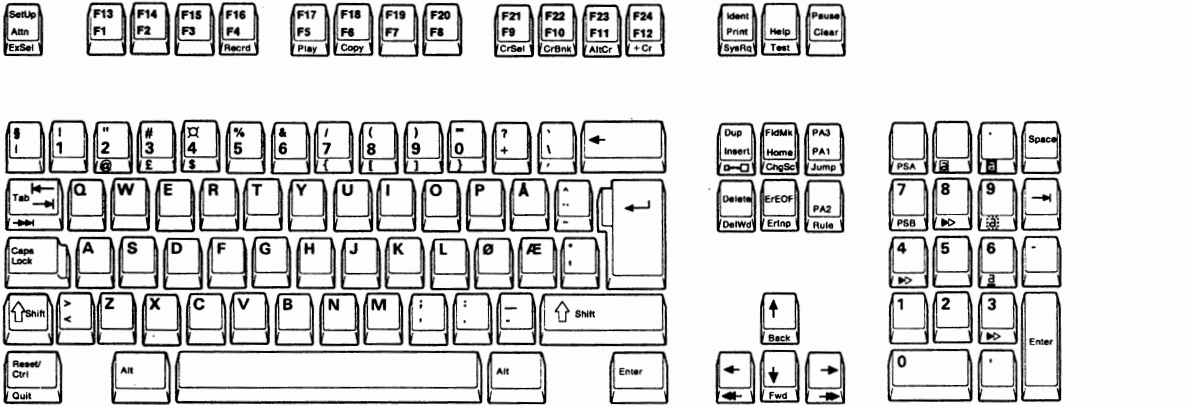
Figure   D-30. Norwegian IBM Enhanced Keyboard
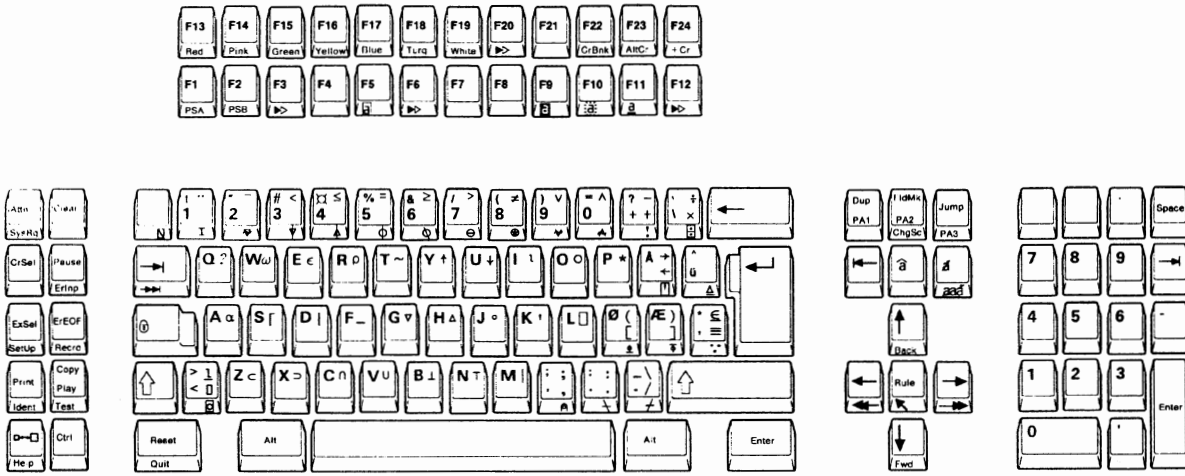
Figure   D-31. Norwegian APL Keyboard
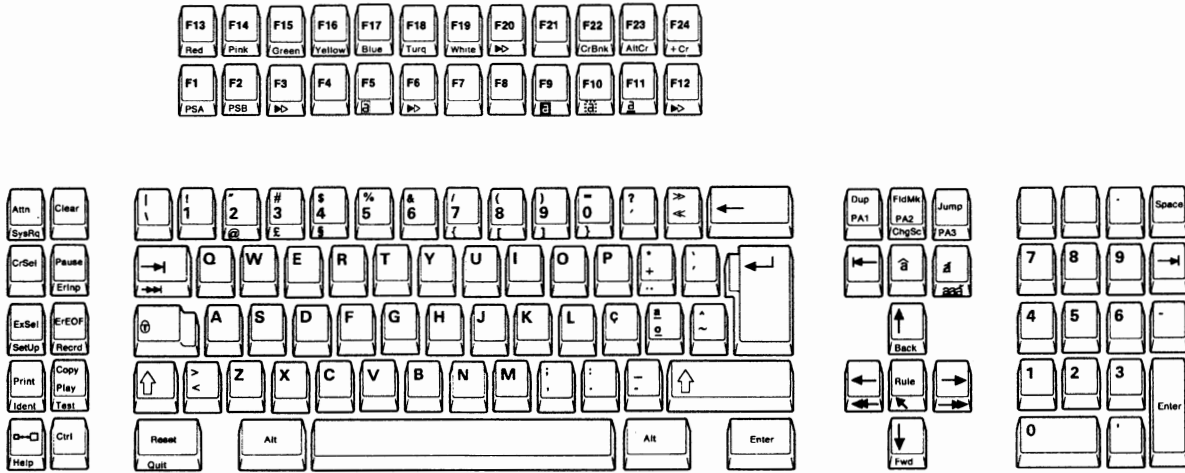
Figure   D-32. Portuguese 122-key Keyboard
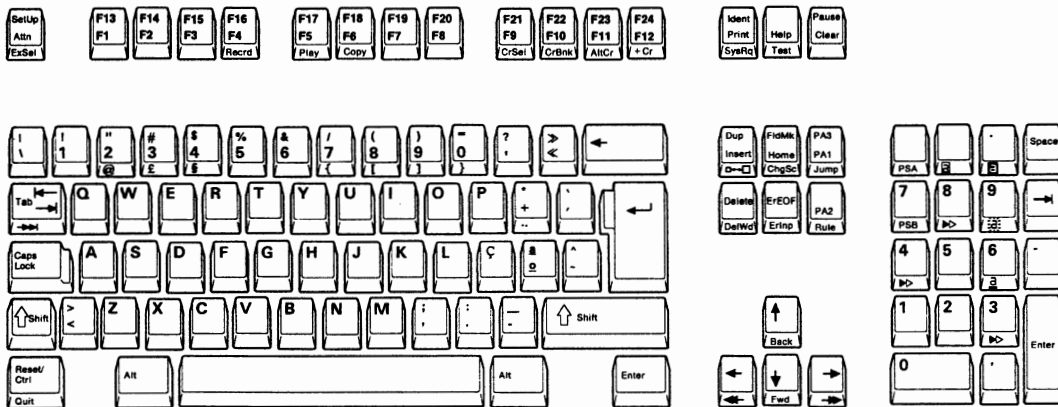
Figure   D-33. Portuguese IBM Enhanced Keyboard
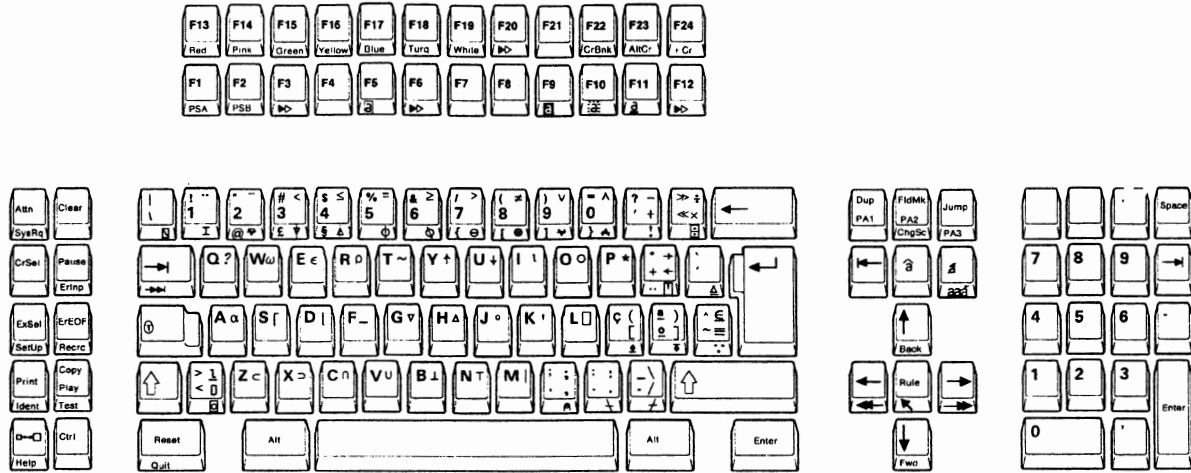
Figure   D-34. Portuguese APL Keyboard
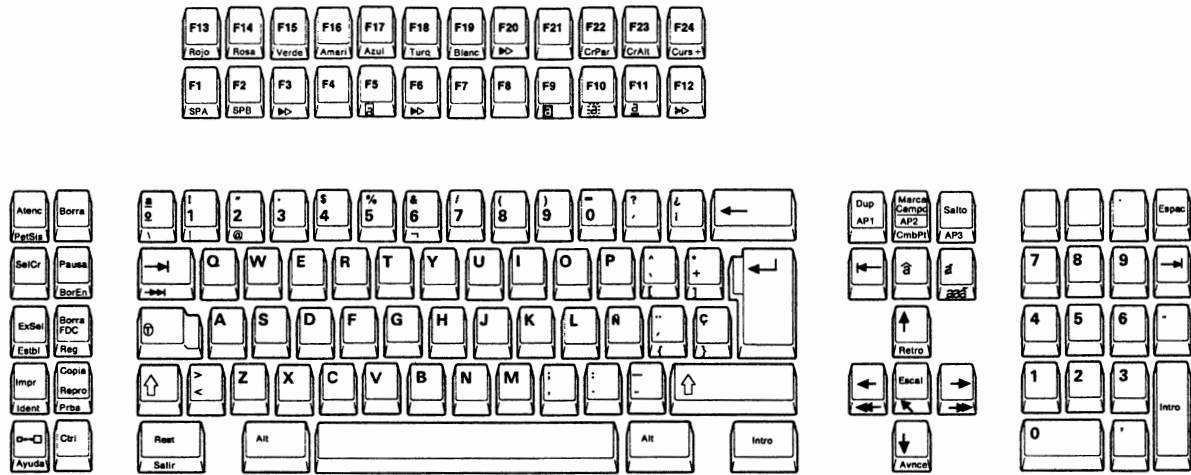
Figure   D-35. Spanish 122-key Keyboard
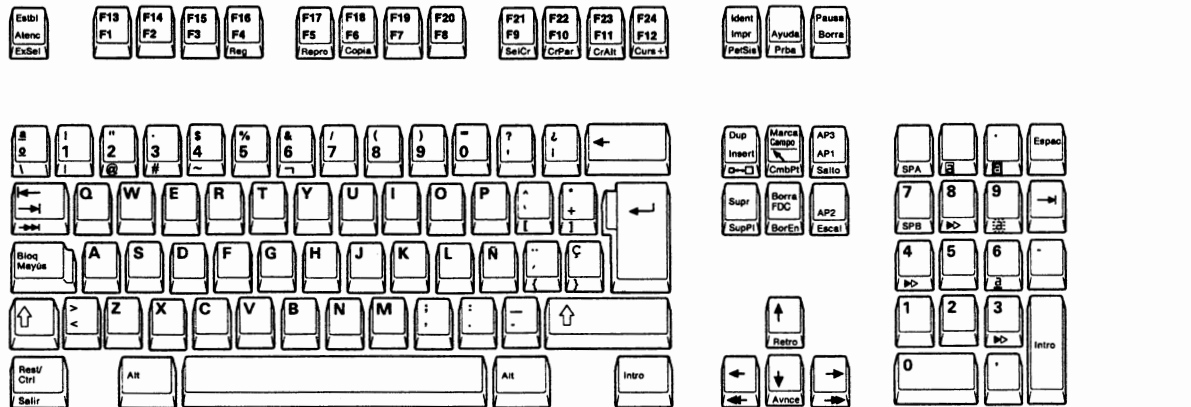
Figure   D-36. Spanish IBM Enhanced Keyboard
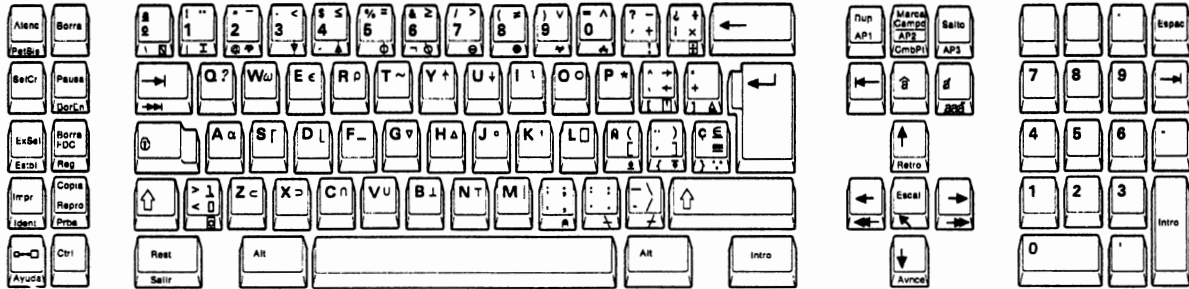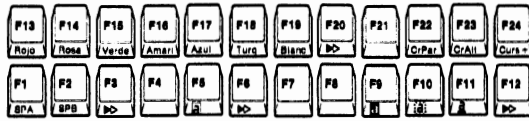
Figure   D-37. Spanish APL Keyboard
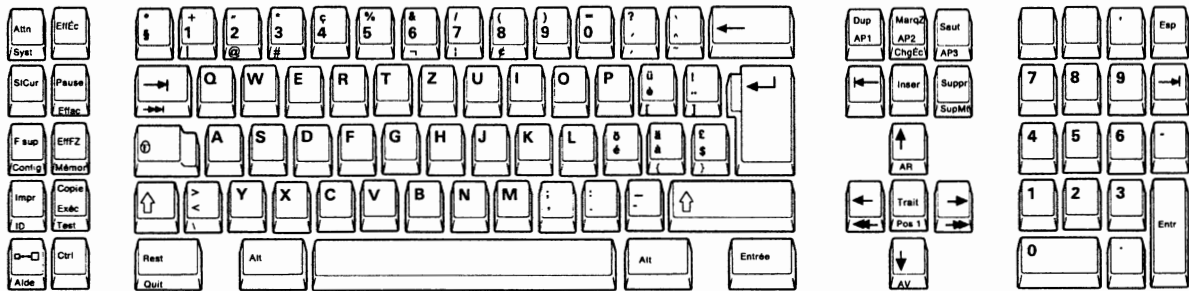
Figure   D-38. Swiss-French 122-key Keyboard
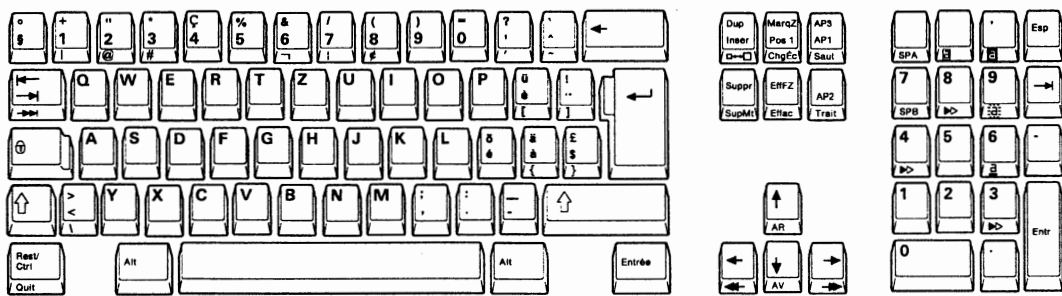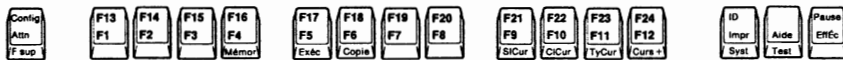
Figure   D-39. Swiss-French IBM Enhanced Keyboard
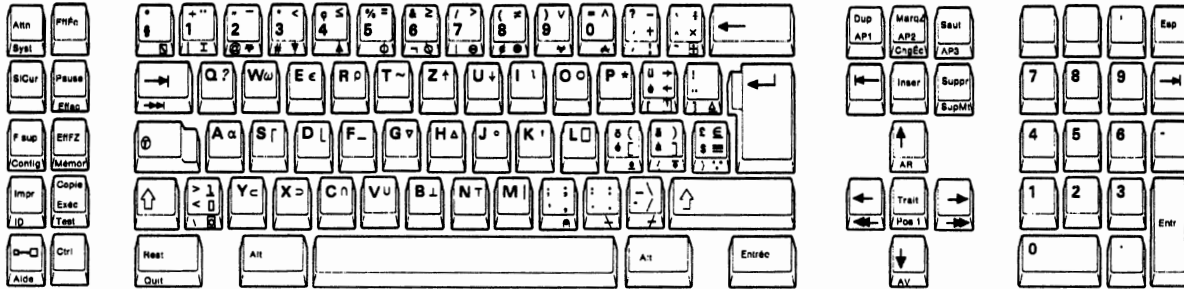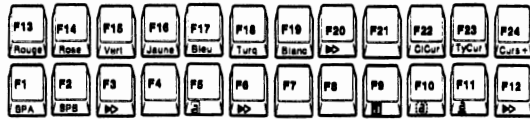
Figure   D-40. Swiss-French APL Keyboard
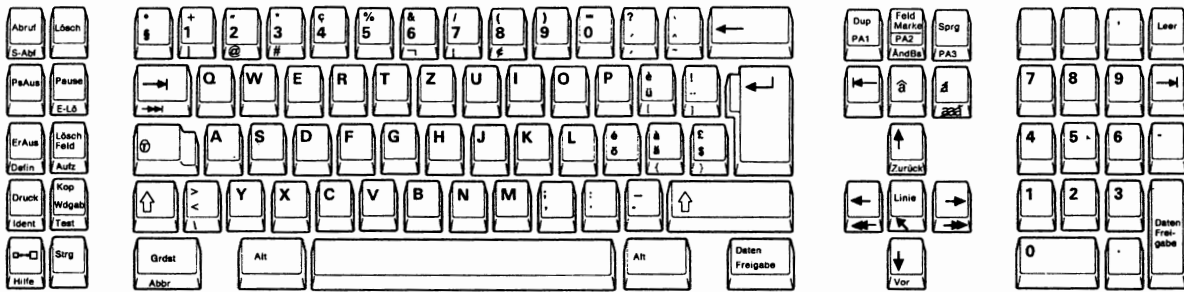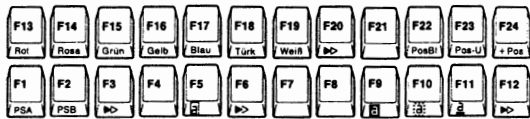
Figure   D-41. Swiss-German 122-key Keyboard
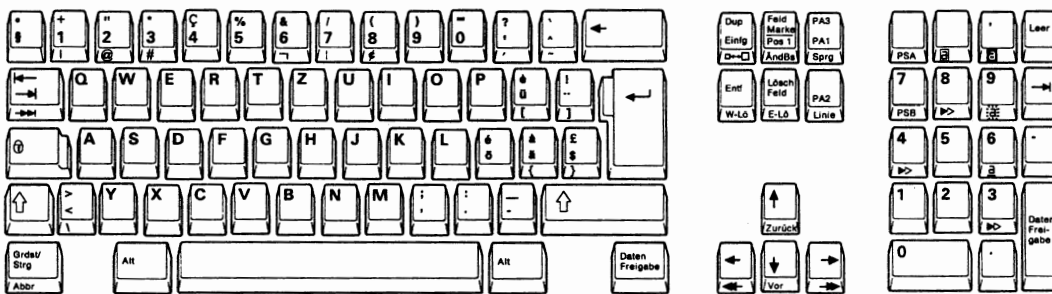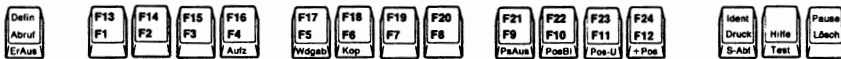
Figure   D-42. Swiss-German IBM Enhanced Keyboard
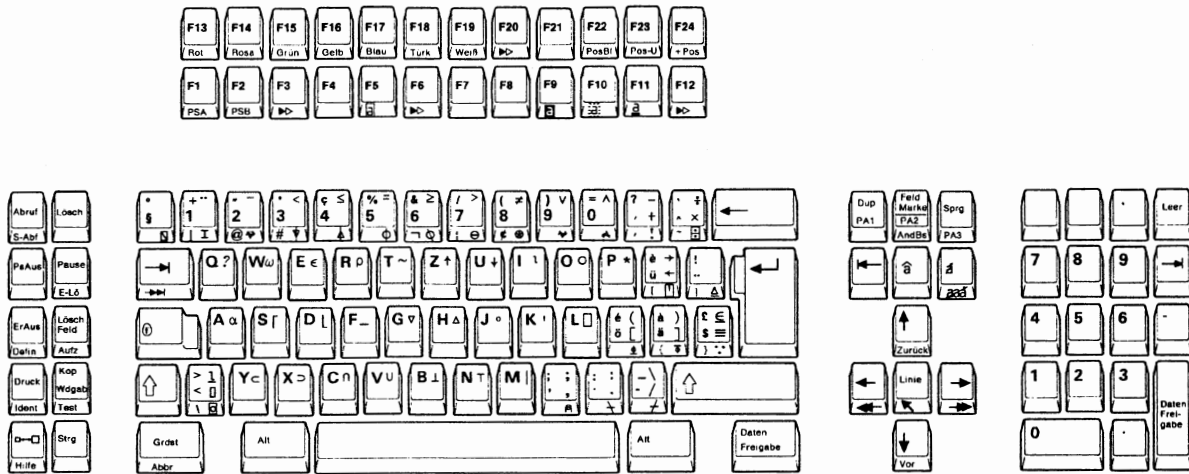
Figure   D-43. Swiss-German APL Keyboard
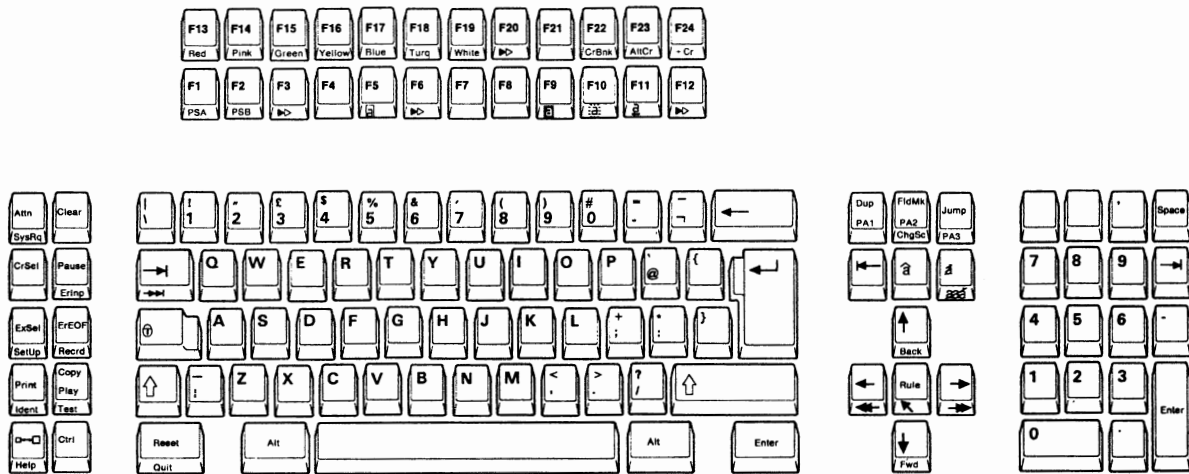
Figure   D-44. U.K. English 122-key Keyboard
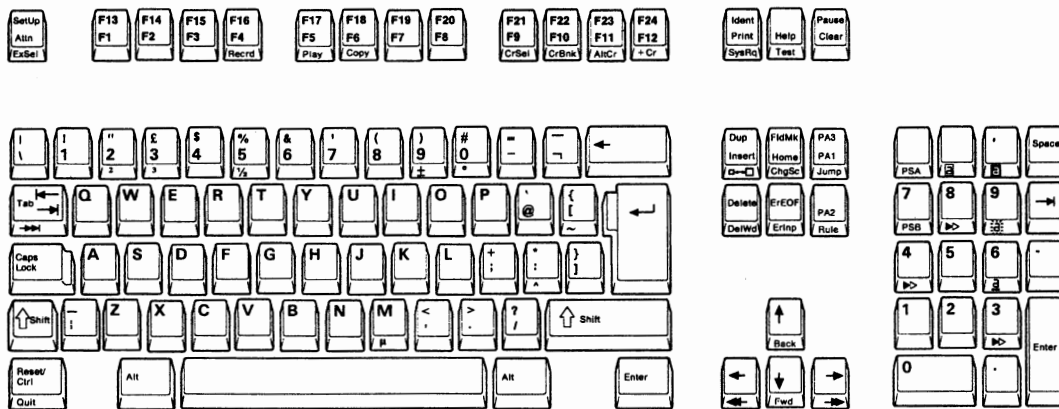
Figure   D-45. U.K. English IBM Enhanced Entry Keyboard
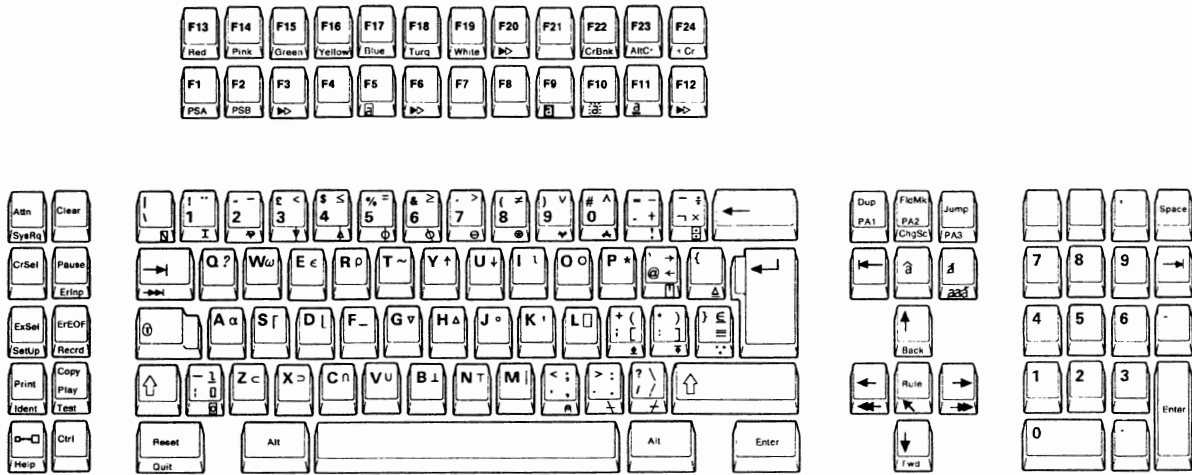
Figure D-46. U.K. English APL Keyboard
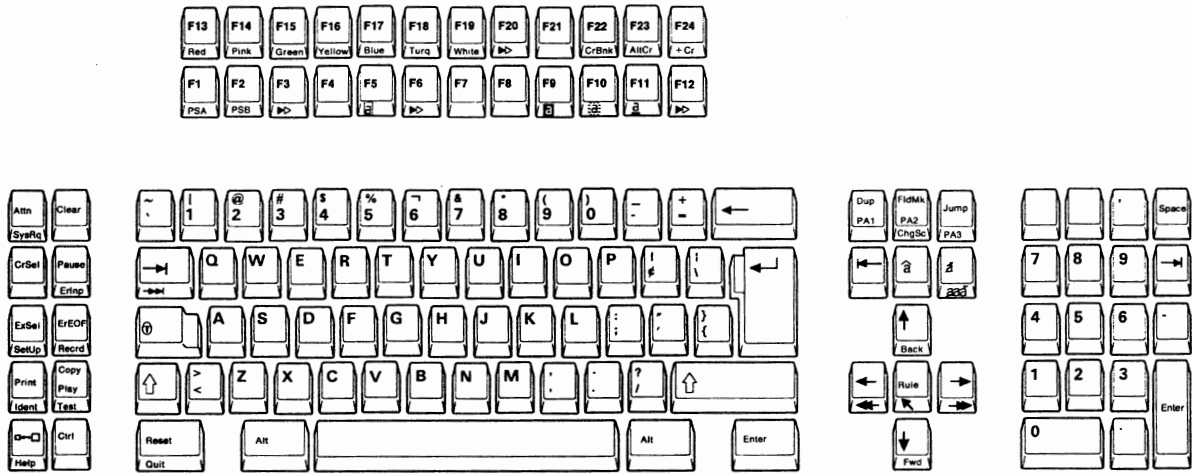
Figure D-47. U.S. English 122-key Keyboard
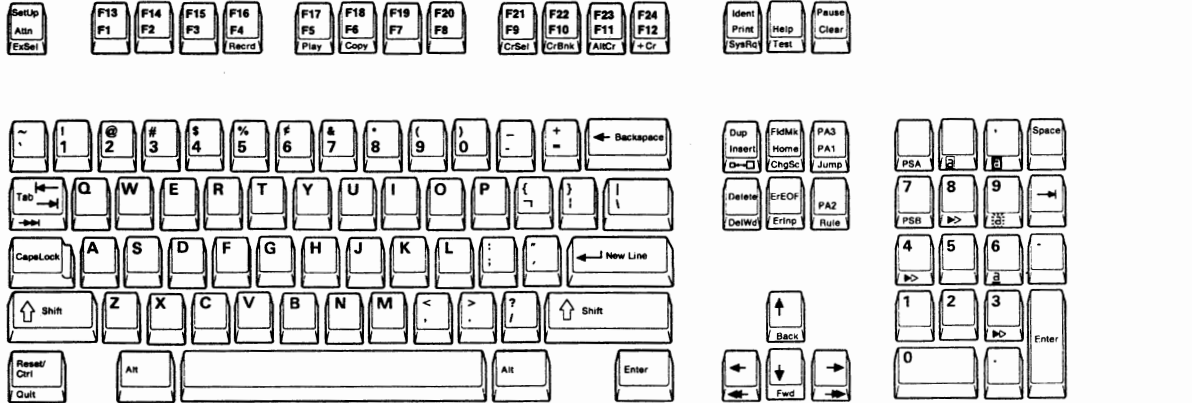
Figure D-48. U.S. English IBM Enhanced Keyboard
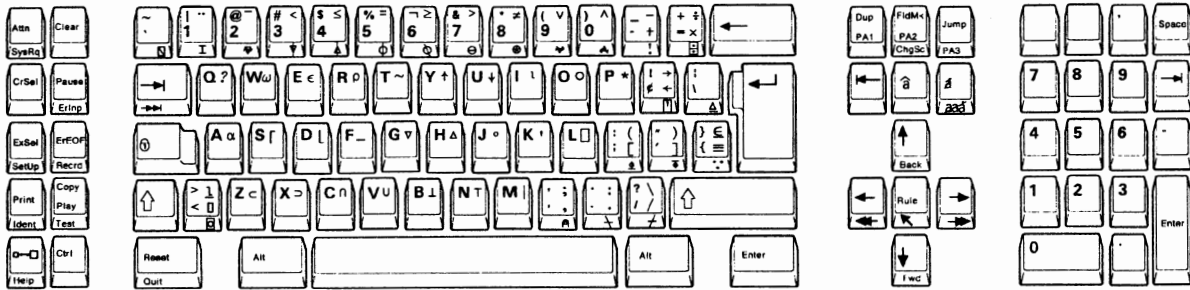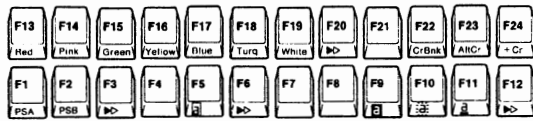
Figure   D-49. U.S. English APL Keyboard
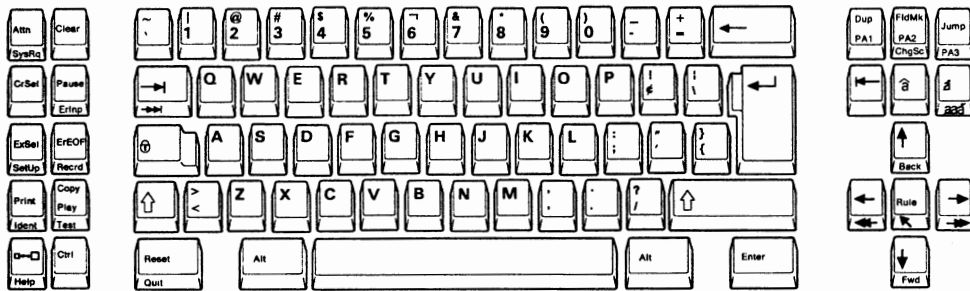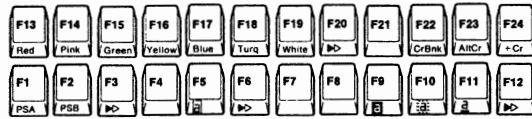
Figure   D-50. U.S. English 104-key Keyboard

Glossary

This glossary defines terms and abbreviations in this manual. If you do not find the term you are looking for, refer to the Index or to the *Dictionary of Computing*, GC20-1699.

Definitions reprinted from the *American National Dictionary for Information Processing Systems* are identified by the symbol (A) following the definition.

Definitions reprinted from a published section of the International Organization for Standardization's *Vocabulary — Information Processing* or from a published section of the ISO *Vocabulary — Office Machines* are identified by the symbol (I) following the definition. Because many ISO definitions are also reproduced in the *American National Dictionary for Information Processing Systems,* ISO definitions may also be identified by the symbol (A).

Definitions reprinted from working documents, draft proposals, or draft international standards of ISO Technical Committee 97, Subcommittee 1 (Vocabulary) are identified by the symbol (T) following the definition, indicating that final agreement has not yet been reached among its participating members.

A

alarm. A signal, usually audible, at a device such as a display station or printer that is used to get the user's attention.

application program. *1.* A program written for or by a user that applies to the user's work, such as a program that does inventory control or payroll. *2.* A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities. *3.* In SDF/CICS, the program using the physical maps and symbolic description maps generated from a source map set.

attribute character. *1.* In SDF/CICS, a character used in the field attribute definition subfunction of the map editor, denoting a set of field attributes. The set of field attributes can be associated with the character in the session profile or with an EQUATE command; synonymous with equate character. *2.* A character associated with a field in a display file that defines how the field is displayed, for example, underlined, blinking, or intensified.

audible alarm. An alarm that is sounded when designated events occur that require operator attention or intervention before continuing system operation.

AZERTY. The key layout of keyboards used in standard European typewriters. The term describes the sequence of the first six letters in the first row of alphabetic keys.

B

BSC. Binary synchronous communication.

C

character. *1.* A member of a set of elements that is used for the representation, organization, or control of data. Characters may be letters, digits, punctuation marks, or other symbols. (T) *2.* A letter, digit, or other symbol that is used as part of the organization, control, or representation of data. A character is often in the form of a spatial arrangement of adjacent or connected strokes. (A)

cathode ray tube display (CRT display). *1.* A device that presents data in visual form by means of controlled electron beams. (A) *2.* The data display produced by the device as in (1). (A)

coaxial cable. A cable consisting of one conductor, usually a small copper tube or wire, within and insulated from another conductor of larger diameter, usually copper tubing or copper braid.

communication controller. *1.* A device that directs the transmission of data over the data links of a network; its operation may be controlled by a program executed in a processor to which the controller is connected or it may be controlled by a program executed within the device. (T) *2.* A type of communication control unit whose operations are controlled by one or more programs stored and executed in the unit. It manages the details of line control and the routing of data through a network.

control unit. See device control unit. See also communication controller.

cursor. A movable, visible mark used to indicate the position at which the next operation will occur on a display surface. (I) (A)

cursor control keys. The keys that control the movement of the cursor. (T)

D

device control unit. A hardware device that controls the reading, writing, or displaying of data at one or more input/output devices or terminals.

display. *1.* A visual presentation of data. (I) (A) *2.* To present data visually. (I) (A) *3.* The word "display" means "cathode ray tube display" in this book. See cathode ray tube display.

display station. An input/output device containing a display screen and an attached keyboard that allows a user to send information to or receive information from the system.

E

EBCDIC. Extended binary-coded decimal interchange code. A coded character set consisting of 8-bit coded characters. (A)

EBCDIC character. Any one of the symbols included in the 8-bit EBCDIC set.

error code. See system reference code.

F

field. *1.* On a data medium or a storage, a specified area used for a particular class of data; for example, a group of character positions used to enter or display wage rates on a screen. (T) *2.* The smallest identifiable part of a record. *3.* In SDF/CICS, a defined data area in a map that contains a set of characters defined, manipulated, or operated on as a unit; the data area is associated with a field attribute.

formatted display. A display in which the attributes of one or more display fields have been defined by the user. Contrast with unformatted display.

function key. *1.* In computer graphics, a button or switch that may be operated to send a signal to the computer program controlling the display. (T) *2.* See programmed function key.

H

highlighting. Emphasizing a display element or segment by modifying its visual attributes. (I) (A)

home position. *1.* A location defined by the user. *2.* The beginning of a file or display. *3.* The position to which a cursor normally returns. *4.* In the 3270 Information Display System, the first unprotected character position in the partition's character buffer, if the character buffer contains at least one unprotected field, or the partition's character buffer address is 0, or if the buffer contains no fields or no unprotected fields.

host system. *1.* A data processing system used to prepare programs and operating environments for use on another computer or controller. *2.* The data processing system to which a network is connected and with which the system can communicate. *3.* The controlling or highest level system in a data communication configuration; for example, a System/38 is the host system for the work stations connected to it.

I

input field. *1.* In computer graphics, an unprotected field on a display surface in which data can be entered, modified, or erased. *2.* A field in a display file into which a user can key in data. An input field is passed from the device to the program when the program reads the record containing that field.

interface. *1.* A shared boundary between two functional units, defined by functional characteristics, common physical interconnection characteristics, signal characteristics, and other characteristics as appropriate. (I) *2.* A shared boundary. An interface may be a hardware component to link two devices or a portion of storage or registers accessed by two or more computer programs. (A) *3.* Hardware, software, or both, that links systems, programs, or devices.

Note: The concept involves specification of the connection of two functional units that have different functions.

K

katakana. A character set of symbols used in one of the two common Japanese phonetic alphabets, which is used primarily to write foreign words phonetically.

key. *1.* An identifier within a set of data elements. (T) *2.* One or more characters used to identify the record and establish the order of the record within an indexed file. *3.* In VSAM, one or more consecutive characters taken from a data record, used to identify the record and establish its order with respect to other records. *4.* In ACF/TCAM, a character string that matches a definition in the key table. This key identifies the destination of a message or special processing to be done on that message. *5.* To enter information from a keyboard. *6.* In sorting, synonym for control word.

keyboard. *1.* An arrangement of typing and function keys laid out in a specified manner. (T) *2.* A systematic arrangement of keys by which a machine is operated or by which data are entered. *3.* A device used to encode data by key depression, which causes generation of the selected code element. *4.* A group of numeric keys, alphabetic keys, or function keys used for entering

information into a terminal and into the system. *5.* See also AZERTY.

keyboard overlay. A template placed on a keyboard to explain the function of each key for a particular application program or for a keyboard program.

key click. Transient pulses or surges on a transmission line set up by the opening or closing of keying circuit contacts.

key in. To enter information by means of a keyboard.

key lock. On a typewriter, a device that prevents keys from being actuated. (T)

keylock feature. *1.* On a display station, a security feature in which a lock and key can be used to restrict use of the station. *2.* In 8100, a processor feature that prevents unauthorized system access by means of a three-position, key-operated switch.

M

margin. *1.* The space above, below, and on either side of the body of a page. *2.* The left or right limit of a column.

N

non-SNA station. In ACF/TCAM, a channel-attached 2260 or 3270 Display Station or a station on a binary synchronous or start-stop line.

non-SNA terminal. A terminal that supports non-SNA protocols; for example, channel-attached 3270 Information Display System or devices supported by Network Terminal Option (NTO) that use binary synchronous protocols. Contrast with SNA terminal.

null. *1.* Empty. *2.* Having no meaning. *3.* Not usable.

null character (NUL). *1.* A control character that is used to accomplish media-fill or time-fill and that may be inserted into or removed from a sequence of characters without affecting the meaning of the sequence; however, the control of equipment or the format may be affected by this character. (I) (A) *2.* The EBCDIC character that represents hex 00. *3.* See also space character.

numeric data. *1.* Data represented by numerals. (I) (A) *2.* Data in the form of numerals and some special characters; for example, a date represented as 81/01/01. Synonymous with numerical data.

numeric field. *1.* An area reserved for a particular unit of information and that can contain only the digits 0 through 9. Contrast with character field. *2.* In the 3270 Information Display System, a display field that accepts only numeric (0-9), minus sign, decimal sign, and DUP keyboard entries.

numeric keypad. On an IBM personal computer keyboard, the lighter-colored keys at the right-hand side that are labeled decimal point (.) and 0 through 9. When the keypad is deactivated by the Num Lock key, the same keys perform other functions: Home, PgUp, PgDn, Del, End, Ins, and cursor control.

O

offline. *1.* Pertaining to the operation of a functional unit when not under the direct control of a computer. (I) (A) *2.* Neither controlled by, nor communicating with, a computer. Contrast with online.

online. *1.* Pertaining to the operation of a functional unit when under the direct control of a computer. (I) (A) *2.* Pertaining to a user's ability to interact with a computer. (A) *3.* Pertaining to a user's access to a computer via a terminal. (A) *4.* Controlled by, or communicating with, a computer. *5.* Contrast with offline.

operator information area. In the 3270 Information Display System, the area near the bottom of the display area where terminal or system status information is displayed. For the 3471/3472, the 25th row of data on the display surface.

P

program access (PA) key. A key that produces a call to a program that performs display operations.

protected field. *1.* In word processing, preset data or an area that can't be changed or overridden by an operator without altering the program. (T) *2.* On a display device, a display field in which a user can't enter, modify, or erase data. Contrast with unprotected field.

public switched network (PSN). Any switching system that provides a circuit switched to many customers. In the USA, there are four: Telex, TWX, telephone, and Broadband Exchange.

R

repeat-action key. A key that, when held fully depressed, causes an action, such as typing a character, to be repeated until the key is released, for example, a typematic key.

S

security keylock. On the 3270, a feature that allows the device to disable all input functions and that blanks the display surface, except for the cursor and displayed indicators, except when the key is inserted in the lock and turned to the ON position.

separator line. The separator line separates the operator information area from the data area of the display screen.

serial number. An integer denoting the position of an item in a series. (I) (A)

space bar. On a typewriter, a control for the space function. (T)

space character (SP). *1.* A character that causes the print or display position to advance one position along the line without producing any graphic character. (T) *2.* See also null character.

Note: The space character is a control character, but it may be used as a graphic character.

SNA. Systems Network Architecture.

system reference code. A code that contains information, such as a failing field-replaceable unit, for a service representative.

system services control point (SSCP). In SNA, the focal point within an SNA network for managing the configuration, coordinating network operator and problem determination requests, and providing directory support and other session services for end users of the network. Multiple SSCPs, cooperating as peers, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units and logical units within its domain.

T

typematic key. A key that repeats its function when pressed and held down.

U

unformatted display. A display screen on which the user has not defined a display field. Contrast with formatted display. See also protected field.

unprotected field. A displayed field in which a user can enter, modify, or delete data. Contrast with protected field.

W

word wrap. In word processing, the capability to move automatically the last word on a line to a new line if it otherwise would overrun the right margin. (T)

X

X.25. *1.* In data communication, a recommendation of the CCITT that defines the interface between data terminal equipment and packet switching networks.

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