



IBM 3270

Personal Computer AT/GX

Maintenance Information

SY33-0125-1



IBM 3270
Personal Computer AT/GX

Maintenance Information

Second Edition, June 1986

The information in this manual is for use with work stations that have an IBM 5379 Display attached to an IBM Personal Computer AT (Advanced Technology) 5373 System Unit, or an IBM Personal Computer AT 5170 System Unit with the Display/ Mouse/Tablet adapter option kit installed.

The manual also includes the information released by TNL SN33-3236 for the *IBM Personal Computer AT/GX: Maintenance Information, SY33-0132* in December 1985. Changes from the first edition or from SN33-3236 are indicated by a vertical line to the left of the change. The release level of the Graphics Processor Microcode must be at least level 12.9 for AT-attachment; see Chapter 2, page 2-6.

IBM has prepared this maintenance manual for the use of IBM service representatives in the installation, maintenance, or repair of the specific machines indicated. IBM makes no representations that it is suitable for any other purpose.

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Federal Communications Commission (FCC) Statement

Warning: The equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction 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.

IBM Statement

The FCC statement makes reference to those machines that are used in the United States.

CAUTION

This product is equipped with a UL-listed and CSA-certified plug for the user's safety. It is to be used with a correctly grounded receptacle to prevent electric shock.

Faint, illegible text, possibly bleed-through from the reverse side of the page.





Safety

● This section contains the following information for ensuring your safety:

- | ● **Safety procedures** for the IBM Personal Computer AT/GX
- **Safety notices** that are used in this manual
- **Rules for safety** (general) including:
 - **First aid** for electrical accidents
 - **Cathode ray tube safety.**

IBM Personal Computer AT/GX Work Station Safety Inspection Guide

Preparation

It is necessary that IBM service representatives should have completed the *Electrical Safety Training Course* (self-study course 77170 or current level), before doing any of the work procedures detailed in this manual.

Reference items:

- Current customer engineering memorandums (CEMS) and engineering change announcements (ECAs).
- Minimum space requirements. (You can obtain this information from *Introducing the IBM 3270 Personal Computer AT/G and AT/GX Ranges of Work Stations*, GA33-3157.)
- *Electrical Safety for IBM Customer Engineers*, S229-3127.

Use the above documents as necessary to ensure that all safety requirements have been met.

Before starting this safety inspection, ensure that machine power is off and all electrical power has been removed from the work station.

Note: If the work station you are to inspect contains features that are not discussed in this manual, observe the safety procedures given in the specific manual(s) for those features. Also, before powering on, ensure that any non-IBM OEM equipment is removed from the work station.



General Guidelines

This inspection guide assists you in identifying possible unsafe conditions that may exist on machines that are being inspected. Each machine, as it was designed and built, had the necessary safety items installed to protect the owners, operators, and service personnel from injury. This checklist addresses only those items. Good judgment should be used to identify possible safety conditions not included in this inspection guide.

If any unsafe conditions are present, you must determine how serious the possible hazard could be and whether you can continue without first correcting the conditions.

Consider the following conditions and the safety hazards they indicate:

- **Electrical:**

The primary power or an electrically charged frame can cause serious or fatal electrical shock.

- **Grounding:**

Frame grounds that are not properly installed can also cause serious or fatal electrical shock. See Chapter 4, Figure 4-24 on page 4-24, Figure 4-25 on page 4-25, Figure 4-26 on page 4-26, Figure 4-27 on page 4-27 and Figure 4-28 on page 4-27.

- **Wiring:**

Damaged insulation and missing cable ties and clips could create a possible fire hazard or cause electrical shock.

- **Explosive:**

For example, distorted capacitors that can cause serious injury.

- Mechanical hazards:

Missing safety covers that can expose hazardous areas.

- Chemical:

Use of chemicals, or solvents other than those specified by IBM. Non-specified materials might damage insulation or give off noxious fumes or cause short-circuiting.

DANGER

Before starting the following checks, switch off mainline power and disconnect the power plugs from the mainline power outlets. Remember that non-IBM devices may have a separate power switch.

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General

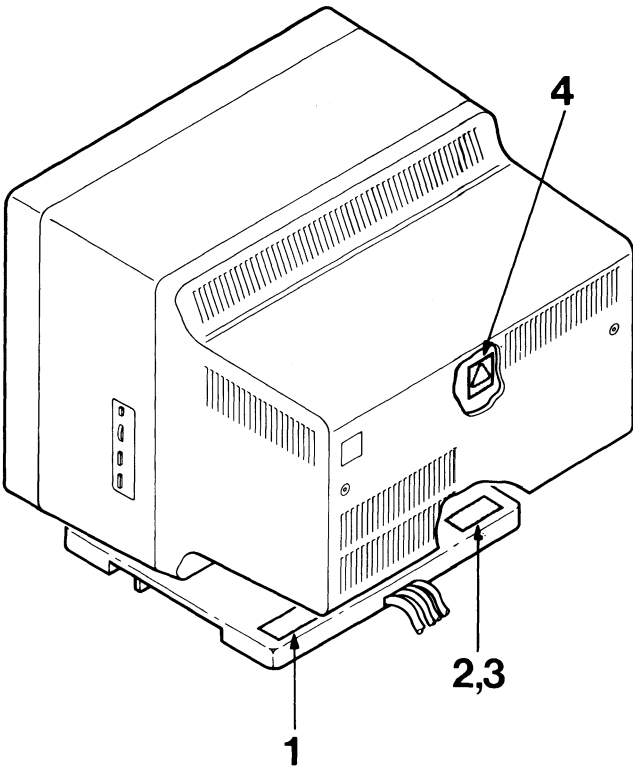
CHECK:

- That covers have no sharp edges, burrs, or damage
- That cables have correct routing with no wear, pinched areas, or frays and that cable ties and clips are installed as necessary
- The mainline power switch for good mechanical and electrical operation.



CHECK:

- The mainline power cable for the following:
 - That the power cable is correctly connected and that insulation is not damaged
 - That a factory-molded plug, with no changes made to it, is installed.
- Any non-IBM changes that may expose a customer or servicing representative to safety hazards. If safety hazards are present, inform your manager.




Display Monitor

Note: This unit does not have a Voltage Selector Switch.


CHECK:

- To ensure that the following labels are installed:
 1. Part 4421634 Label – 5379 M01 (Monochrome),
or
 1. Part 4421636 Label – 5379 C01 (Color).
 2. Part 4421641 Label – FCC Notice (U.S.),
or
 3. Part 4421642 Label – FCC Notice (Germany).
 4. Part 4421680 Label – Hazard, 25000 V.

1

Manufactured in Italy for International Business Machines Corporation Armonk New York U.S.A.	Type 5379-C01 VA 200 V 100-240 A 1.5-0.65 Hz 50-60
3119 208 89751 AN 01 8412	 35 kg

2

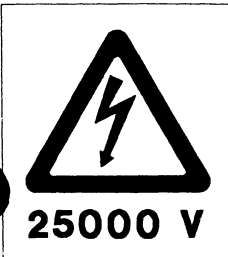
This equipment complies with the requirements in Part 15 of FCC Rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.	
 Listed 18C9 E.D.P. Equip.	• Registered Trademark of International Business Machines Corporation IBM Canada Ltd. Registered User E 92049

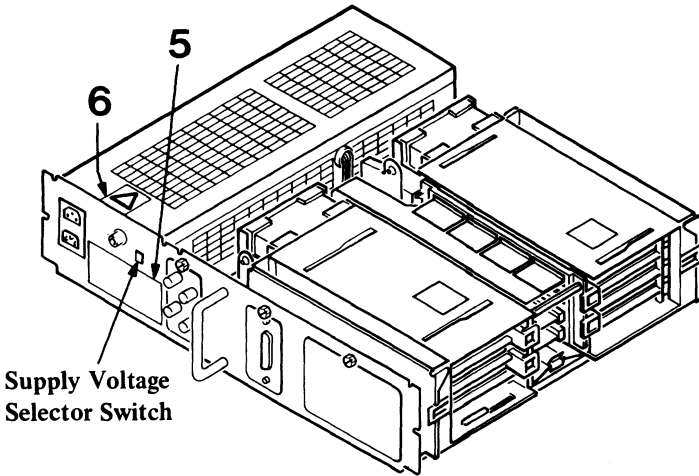


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Die in diesem Gerät entstehende Röntgenstrahlung ist ausreichend abgeschirmt
Beschleunigungsspannung Max 26.5kV
BW/172/84/Ro

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Display Attachment Unit

CHECK:




- To ensure that the supply-voltage selector-switch is set correctly for your mainline power outlet.
- To ensure that the following labels are installed:

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|-------------------|-------------------------------|
| 5. Part 4421638* | Label – DAU C01 (Color), |
| or | |
| 5. Part 4421694* | Label – DAU M01 (Monochrome), |
| or | |
| 5. Part 4421637** | Label – DAU C01 (Color), |
| or | |
| 5. Part 4421635** | Label – DAU M01 (Monochrome). |
| 6. Part 4421640 | Label – Hazard, 800 V. |

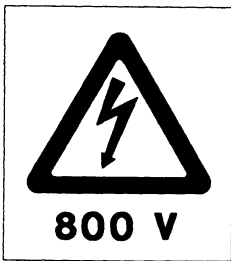
* Manufactured Raleigh

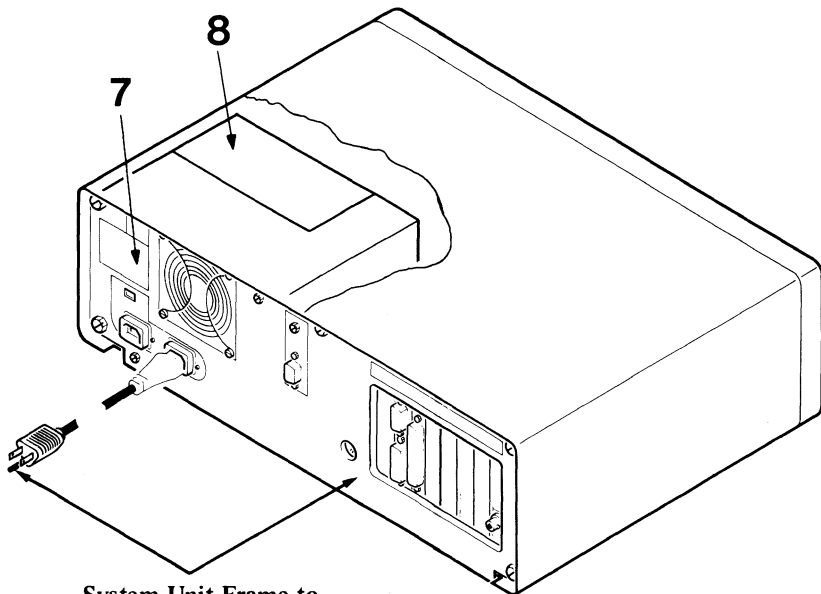
** Manufactured Greenock

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Type 5378-M01 VA 360 Hz 50 - 60 V 90 - 137 V 180 - 264 01 A 4 - 2 A 2 - 1		Warning: For continuous protection against fire, replace only with the same type and rating of fuse 6A T 250V
J2 Auxiliary Power VA 200	Manufactured by International Business Machine Corporation Armonk New York USA	This newly manufactured machine may contain used parts equivalent to new in performance at time of manufacture
  Listed 167G E.D.P. Equip.	This equipment has been tested with a class A computing device and has been found to comply with part 15 of FCC rules, see instruction manual. Operations in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.	
• Registered Trademark of International Business Machines Corporation IBM Canada Ltd Registered User		

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System Unit Frame to
Ground Pin on Plug

Personal Computer AT, System Unit


- Check that the continuity between the ground pin and the system unit frame is less than 0.1 ohm. See above.
- Check the power cables for the presence of ground pins. For detachable power cables, check for continuity (less than 0.1 ohm) from end to end.
- Open the system unit by removing the larger screws on the back of the system unit and pulling the cover forward and up.
- Check to ensure that the following labels are installed:
 7. Label, System Unit.
 8. Label, Hazardous Warning.

Both labels are included in Part 8654388, Label Kit.

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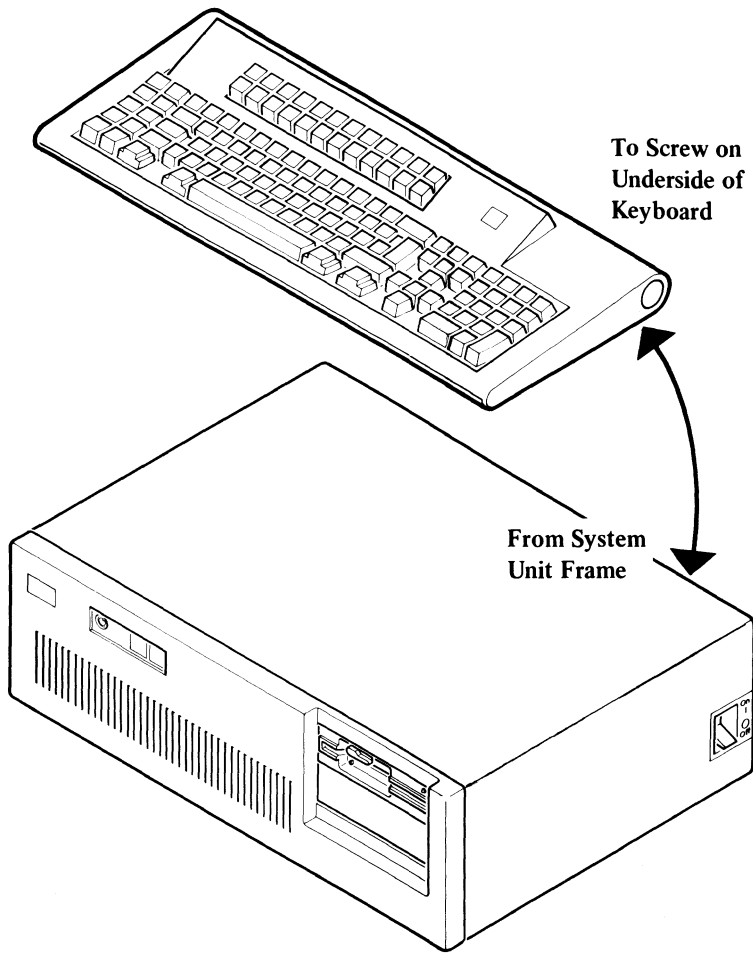
Manufactured by IBM Corporation	IBM	® Registered Trademark of International Business Machine Corporation IBM Canada Ltd. Registered User
Made in U.S.A. Type No. 5373	Marca Registrata	
This equipment complies with the requirements in part 15 of FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause undesirable interference to radio and TV reception requiring the operator to take whatever steps necessary to correct the interference.		
Copyrighted code contained herein © Copyright 1985 IBM Corp.		
Auxiliary Power To	220V RANGE 220-240~ 2 SA 50 60 Hz	115V RANGE 100-125 VAC SA 50 60 Hz
S151	UL	UL
	Listed E.O.P. Equip. 187C	Certified only to C.E. Code
		Certifié en vertu du C.E. règlement

or

IBM	Manufactured in Greenock, Scotland U.K. By IBM United Kingdom Ltd. Type No. 5373
Copyrighted code contained herein © Copyright 1985 IBM Corp.	
Auxiliary Power To	220V RANGE 220-240V 2 SA 50 60 Hz
S151	115V RANGE 100-125 VAC SA 50 60 Hz

8

CAUTION!	HAZARDOUS AREA
Do not remove this cover. Trained service people only. No serviceable components inside.	
ATTENTION!	ZONE DANGEREUSE
Ne pas ouvrir les couvercles sous aucun prétexte. Reservée au personnel autorisé. Il n'y a pas de composants qui puissent être entretenus par l'utilisateur ou en clientèle.	
VORSICHT!	GEFAHRENZONE
Abdeckungen unter keinen Umständen abnehmen! Zutritt nur für ausgebildetes Personal. Es sind keine vom Benutzer oder vom Service zu wartende Bauteile vorhanden.	
ATTENZIONE!	PERICOLO
Non aprire il coperchio in nessun caso. Solo personale addestrato. Non ci sono componenti che possono essere sottoposti a servizio dall'utente o fuori fabbrica.	
PRECAUCION!	AREA PELIGROSA
Las cubiertas no deben abrirse bajo ninguna circunstancia. Solo personal mantenimiento cualificado. No hay partes que puedan recibir mantenimiento por el usuario o otros.	



Keyboard

- Check that the continuity between the system unit frame and the lock screw on the bottom of the keyboard is less than 0.1 ohm. See above.

Guidelines when Using this Manual

The space after each notice allows the service representative to translate the notice into the local language.

1. **DANGER**

If a machine failure occurs, the operator is not permitted to check voltages; this is reserved for IBM Service Representatives. Repair work must only be done by such personnel.

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It is assumed that when a service representative arrives at a work station location the customer has already (1) used the correct problem determination procedures to determine that the failure is in the IBM equipment, and (2) completed a Problem Report form.

2. **DANGER**

Switch Off all mainline power from the work station before removing or installing FRUs, cables or other components, or before attempting to service any component that is not correctly installed.

Before starting work on the 5379 display or its associated components, read and observe the CRT and EHT safety procedures given at the front of this manual.

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- 3. **Warning:** The FRUs in each unit may contain ESD-sensitive components. Before starting work, read the notes: "Handling of Electrostatic-Discharge- (ESD) Sensitive Parts" on page 5-9.

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- 4. **Warning:** The air slots on all units must be kept free of obstructions at all times. Overheating damages components in the units.

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- 5. **Warning:** A fixed disk drive can easily be damaged when the system unit in which it is installed is moved. To prevent such damage occurring the drives should be locked before the system unit is moved. For details of the locking procedure see Chapter 5, page 5-12.

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6. **Warning:** All data on a fixed disk drive should be backed up onto diskettes. This should be done because:

- Normal shipping and handling of fixed disk units can result in disk formatting data being destroyed and also permanent loss of data that is on the disk.
- All data on a fixed disk drive is destroyed when you have a need to format the drive.

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7. **Warning:** Some PC options and devices are supplied with their own diagnostic diskettes and problem determination procedures that have instructions to "discard the existing diskette and procedures." This instruction does not apply to the IBM 5379, and the original diskette and problem determination procedures should be retained.

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Other Safety Notices Used in this Manual (Listed by Chapter)

The space after each notice allows the service representative to translate the notice into the local language.

Front

Danger Notices

DANGER

Before starting any checks, switch off mainline power and disconnect the power plugs from the mainline power outlets. Remember that non-IBM devices may have a separate power supply and switch.

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DANGER

If a machine failure occurs, the operator is not permitted to check voltages; this is reserved for IBM Service Representatives. Repair work must only be done by such personnel.

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DANGER

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Warning: The air slots on all units must be kept free of obstructions at all times. Overheating damages components in the units.

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Caution Notices

CAUTION

This product is equipped with a UL-listed and CSA-certified plug for the user's safety. It is to be used with a correctly grounded receptacle to prevent electric shock.

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CAUTION

Use extreme care when you perform rescue breathing for a victim who may have breathed-in toxic fumes. Do not breathe-in air that the victim has breathed-out.

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Chapter 1

Warning Notices

Warning: Do not use acid solutions or abrasive materials to clean the screen (display surface) because they will damage the nonreflective coating.

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Warning: The correct power-on and power-off sequences must be observed at all times.

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Chapter 2

No danger, warning, or caution notices.



Chapter 3

Danger Notices



DANGER

Switch off all power before removing or installing each device.

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Warning Notices

Warning: Do not short the pins together when taking voltage readings because damage to the boards may occur.

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Warning: Normal shipping and handling can cause permanent loss of all data and format information from the fixed disk. It is recommended that all files be backed up onto diskettes.


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Warning: All data on the fixed disk drive is destroyed when formatted.



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Caution Notices

CAUTION

Do not disconnect or reconnect a coaxial cable or IBM cabling system during an electrical storm.

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Chapter 4

No danger, warning, or caution notices.

Chapter 5

Danger Notices

DANGER

Do not reconnect the primary power card mainline input connector when the safety cover is removed from the main assembly.

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DANGER

Switch off the power and remove the mainline power supply cable from the mainline power outlet.

The power supply unit may be hot; do not touch it until it has cooled.

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DANGER

Switch off the power and remove the mainline power cable from the power supply outlet before removing the fuse. Always use a fuse of the correct type and rating.

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DANGER

- 1. There are high voltages under the printer cover. Only service representatives may remove or install the printer mainline fuse.**
- 2. Switch Off the power and remove the mainline power cable from the mainline power outlet.**

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Warning Notices

Warning:

1. The power-off (system unit first) and power-on (system unit last) sequences must be observed at all times (see Chapter 1, page 1-18).
2. The primary power LED is On if mainline power is reaching the 5379 display. However, if the LED is Off this does not mean that the display is disconnected from the mainline power outlet.
3. Always lock the tilt and swivel mechanism in the required position before starting removal or installation procedures.

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Warning: Normal shipping and handling of fixed disk units can result in disk formatting data being destroyed and also permanent loss of data that is on the disk.

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Warning: Ensure that you install the same two fastening screws and the mounting-plate screw already removed, or ones that are similar to them, to prevent damage to the disk unit.

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Warning: Do not pull on the wires when disconnecting the connectors.

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Warning: Safety glasses must be worn when handling the CRT. Read the warning notices in the front matter of this manual.

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Warning: Always use a card holder (IBM part 1743144) when installing a card, to prevent contact with other cards.

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Warning: The pins on the coprocessor are easily bent. Be careful not to bend the pins when removing the coprocessor.

The coprocessor is static sensitive. Maintain personal grounding by touching the system unit frame with one hand while removing the coprocessor.

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Caution Notices

CAUTION

The display weighs approximately 35 kg (75 lb), and the system unit weighs approximately 22 kg (50 lb); you will need aid in lifting the units.

Always protect the work-surface from damage when moving the units.

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CAUTION

The neck of the CRT is easily broken, care must be taken when removing the main assembly.

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Warning: Always protect the work-surface from damage when moving the DAU.

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CAUTION

The fan must be installed so that it blows air from the logic cards to the power supply unit. Check that the airflow direction arrows on the outer molding of the fan are pointing in the same directions as shown in the figure.

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CAUTION

Check that the support-stay is locked in position; if not, the gate may fall and damage components.

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CAUTION

Note that for the next step the top cover is still attached to the base by the wiring to the control switches.

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Chapters 6 and 7

No danger, warning, or caution notices.

Rules for Safety

If (1) you know the safety rules for working with electrical and mechanical equipment and (2) you observe the rules, you can work safely with IBM equipment.

Do not fear electricity, but respect it.

While you are maintaining IBM equipment, (1) observe every safety precaution possible and (2) observe the following safety rules.

Work Environment

- Do not work alone in hazardous conditions or near equipment that has dangerous voltages. Always inform your manager if the conditions or voltages are a possible problem.
- Always look for possible hazards in your work environment. Examples of hazards are: moist floors, nongrounded extension cables, power surges, and missing safety grounds.
- Do not perform any action that makes the equipment unsafe or that causes hazards for the customer personnel.
- Before you start the equipment, ensure that other service representatives, and customer personnel, are not in a hazardous position.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that the sleeves of your clothing are fastened or are rolled above the elbow. If your hair is long, or if you wear a neck scarf, fasten it to make it safe.
- Insert your necktie into your clothing or fasten it with a clip (preferably nonconductive) at approximately 8 centimeters (3 inches) from its end.

- Lift the equipment or parts by standing or pushing up with your stronger leg muscles; this action removes the strain from the muscles in your back. Do not lift any equipment or parts that are too heavy for you.
- Put removed machine covers in a safe place while you are servicing the machine. Reinstall the covers before returning the machine to the customer.
- Always keep your tool kit away from walk areas so that other persons cannot trip over it. For example, keep the kit under a desk or table.
- Observe good housekeeping practices in the area of the machines while you are performing maintenance and after completing it.
- After maintenance, reinstall all safety devices, such as guards, shields, labels, and ground wires. Exchange safety devices that are worn or defective. (**Remember:** the safety devices protect you from a hazard. You destroy their purpose if you do not reinstall them when you have completed the service call.)

Electrical Safety

- If possible, always unplug the power-supply cable before you work on a machine. When you switch off power at the mainline power outlet, lock the switch in the off position or attach a DO NOT OPERATE tag (Z229-0237) to the switch.

Note: A non-IBM attachment to an IBM machine may be powered from another source and may be controlled by a different switch or circuit breaker.

- Switch off all power before (1) removing or assembling the main units of the equipment, (2) working near to power supplies, (3) inspecting power supplies, or (4) installing changes in machine circuits.
- Unless the maintenance documents specifically instruct you, do not service the following parts with power on **if the part is removed from its installed position in the machine:** power supplies, pumps, blowers, motor generators, and other units with voltages that are more than 30 V ac or 42.4 V dc. (This rule ensures that correct grounding is maintained.)
- If you really need to work on equipment that has exposed live electrical circuits, observe the following precautions:
 - Ensure that another person, who is familiar with the power-off controls, is near you. Another person must be there to switch off the power, if necessary.
 - Do not wear jewelry, chains, metal-frame eyeglasses, or other personal metal objects. (**Remember:** if the metal touches the machine, the flow of current increases because the metal is a conductor.)
 - Use only insulated probe tips or extenders. (**Remember:** worn or cracked insulation is unsafe.)

- Use only one hand while you are working on live equipment. Keep the other hand in your pocket or behind your back. (**Remember:** there must be a complete circuit for an electrical shock to occur. This precaution prevents **your body** from completing the circuit!)
- When you use a tester, set its controls correctly and use insulated probes that have the correct electrical specification.
- Do not touch objects that are grounded, such as metal floor strips, machine frames, or other conductors. Use suitable rubber mats, obtained locally if necessary.
- When you are working with machines having voltages more than 30 V ac or 42.4 V dc, observe the special safety instructions given in customer engineering memorandums (CEMs).
- Never **assume** that power has been removed from a circuit. First, **check** that it has been removed.
- Do not touch live electrical circuits with the surface of a plastic dental mirror. (**Remember:** the surface of the dental mirror is conductive and can cause damage and personal injury.)
- If an electrical accident occurs:
 1. **Use caution; do not be a victim yourself.**
 2. **Switch off the power.**
 3. **Instruct another person to get medical aid.**
 4. **If the victim is not breathing, perform mouth-to-mouth rescue breathing. See “Electrical Accidents – First Aid” on page xxxix .**



Mechanical Safety

Do not touch moving mechanical parts when you are (1) lubricating a part, (2) checking for play, or (3) doing other similar work.



Safety Glasses

Wear safety glasses when:

- Using a hammer to drive pins or similar parts
- Using a power drill
- Using a spring hook to attach or remove a spring
- Soldering parts
- Cutting wire or removing steel bands
- Using solvents, chemicals, or cleaners to clean parts
- Working in any other conditions that could injure your eyes.



Tools, Testers, and Field-Use Materials

- Do not use tools and testers that have not been approved by IBM.
- Exchange worn and broken tools and testers.
- Do not use solvents, cleaners, or oils that have not been approved by IBM.


Summary

Prevention is the main aid to electrical safety. Always think about electrical safety and use **good practice**, for example:

- Ensure that the customer's power receptacle matches the IBM equipment specifications.
- Inspect power cables and plugs; check for loose, damaged, or worn parts.
- Review the procedure in the maintenance documents before you remove a part that can hold an electrical charge from the machine. **Carefully** discharge the necessary parts exactly as instructed by the procedure.
- Do not use a normal light (for example, a table lamp) as an extension trouble light at a machine.

Never **assume** that a machine or a circuit is safe. No machine is **always** completely safe. You may not know the exact condition of a machine because, for example:

- The power receptacles could be wrongly wired.
- Safety devices or features could be missing or defective.
- The maintenance and/or changes history could be wrong or not complete.
- The design could have a problem.
- The machine could have damage, caused when it was shipped.
- The machine could have an unsafe change or attachment.
- An engineering change or a sales change could be wrongly installed.

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- The machine could be deteriorated (1) because it is old or (2) because it operates in an extreme environment.
 - A part could be defective, therefore causing a hazard.
 - A part could be wrongly assembled.

These are some of the ways that the condition of the machine could affect safety. **Before you start a service call or procedure, have good judgment and use caution.**

Electrical Accidents – First Aid

When performing rescue procedures for an electrical accident, do as follows:

- **Use Caution:** If the victim is still in contact with the electrical-current source, remove the power; to do this, you may need to operate the room emergency power-off (EPO) switch or the disconnecting switch. If you cannot find the switch, use a dry wooden rod or other nonconductive object to pull or push the victim away from contact with the electrical-current source.
- **Work Quickly:** If the victim is unconscious, he/she may need (1) mouth-to-mouth rescue breathing and possibly (2) external cardiac compression if the heart is not beating.
- **Call for the Rescue Service,** such as the ambulance or the hospital. Instruct another person to call for medical aid.

Determine if the victim needs mouth-to-mouth rescue breathing. If he/she does, perform the following steps.

CAUTION

Use extreme care when you perform rescue breathing for a victim who may have breathed-in toxic fumes. Do not breathe-in air that the victim has breathed-out.

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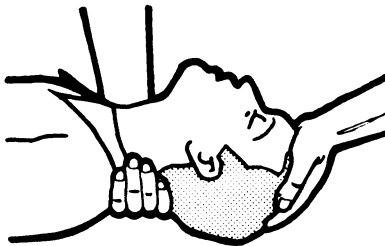
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1. Prepare for rescue breathing:

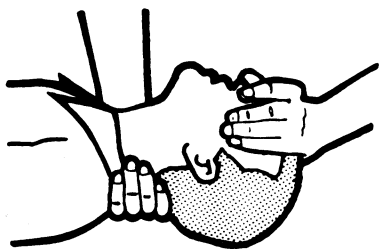
- a. Ensure that the victim's airway is open and that it is not obstructed; check the mouth for objects that may be obstructing the airway, such as chewing gum, food, dentures, or the tongue.
- b. Place the victim on his/her back, put one hand behind the victim's neck, and put the other hand on his/her forehead.
- c. Lift the neck with one hand, and tilt the head backward by pressing on the forehead with the other hand.



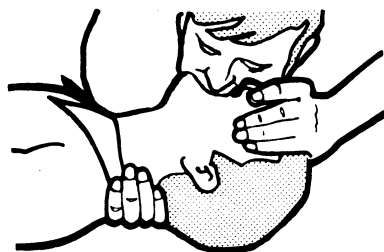
2. **Look, listen, and feel** to determine if the victim is breathing freely:

- a. Put your cheek near to the victim's mouth and nose.
 - b. Listen and feel for the breathing-out of air. At the same time, look at the victim's chest and upper abdomen to see if they move up and down.
3. If the victim is not breathing correctly:

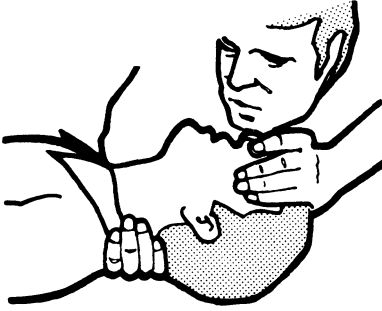
- a. Keep the victim's head tilted backward. Continue to press on the forehead with your hand; at the same time, rotate this same hand so that you can pinch together the victim's nostrils with your thumb and finger.



- b. Open your mouth wide and take a deep breath. Make a tight seal with your mouth around the victim's mouth and blow into the victim's mouth.



- c. Remove your mouth to let the victim breathe-out, and check that the victim's chest moves down.



- d. Repeat steps b and c once every 5 seconds either until the victim breathes for himself/herself or until medical aid comes.

Reporting Accidents

Report, to your **field manager**, all electrical accidents, possible electrical hazards, and accidents that nearly occurred. (**Remember:** an accident that nearly occurs might be caused by a design problem; your immediate reporting ensures that the problem will be solved quickly.)

Report also all small electrical shocks. (**Remember:** a condition that causes a small shock need only differ slightly to cause serious injury.)

Cathode Ray Tube (CRT) Safety

The primary hazard of CRTs is flying glass as a result of an implosion. The following sections deal with different phases of CRT SAFETY. All phases are equally important and negligence in any area could result in possible injury to an employee or customer.

Any additional information or variation from this information will be included under that specific unit's CEM/Service Aids.

Storage of Cathode Ray Tubes

1. Cathode ray tubes must be enclosed when received, transported, or otherwise moved from area to area.

If they are shipped in a carton, they must be in the original carton or one of equivalent strength, and securely sealed to prevent accidental opening. Also, original or equivalent packing materials and/or forms must be placed inside the carton to give the CRT proper support and protection. If CRTs are transported in a unit or piece of equipment, the equipment must be able to contain the glass fragments should an implosion occur.

2. CRTs should be stacked as per directions on manufacturer's carton. When in doubt, stack with faceplate (viewing surface) down. Cartons should not be stacked more than two high.
3. CRT storage areas will be away from normal flow of material handling equipment and pedestrian traffic. Also, storage areas must be dry to ensure that cartons will not absorb moisture and collapse.

Maintenance and Installation of Cathode Ray Tubes

1. No one shall be permitted to install, adjust, maintain, replace, or handle high-vacuum CRTs until he has reviewed these instructions.
2. Ensure that all customer personnel vacate the immediate area when you are exchanging a display.
3. CRTs when received, transported, or otherwise moved from area to area should be completely enclosed in their original shipping cartons and sealed.
4. When handling CRTs, personnel must wear safety equipment at all times. The required safety equipment is:
 - a. Safety glasses – IBM part 5715010
 - b. Long-sleeved garment.
5. CRTs under vacuum will not be permitted to remain out of their cartons unless they are under test or inspection.
6. Do not scratch or bump any part of the CRT because this may weaken the glass and possibly cause it to implode.
7. Before removing any CRT, discharge all stored potential that may exist on the CRTs anode button or base socket pins and the capacitor in the high-voltage supply.

Note: Some CRTs contain a conductive coating on both the inside and outside surfaces to form a capacitor. Within some CRTs, a second capacitive charge builds up following the original discharge. It is therefore important to discharge each CRT a second time immediately before removal.

8. Do not handle CRTs by the neck alone. The neck is the weakest part of the CRT and is easily broken. Always handle CRTs with two hands. If the CRT is shipped with a lifting strap, use this strap for removing a CRT from, and placing a CRT into, the shipping container.
9. When inserting or removing CRTs from equipment, they must be supported by the large end while carefully guiding the neck in or out of position. The lifting strap, if present, can be used in this process.
10. Do not place the CRT on a table or bench when there is any possibility of the CRT rolling. If it is necessary to place a CRT anywhere except in its special carton, a piece of felt or other soft material should be placed under it to prevent scratching the glass. Place larger CRTs vertically on their faces, and not on their sides, to prevent the possibility of rolling.
11. When removing a CRT from equipment, it should be enclosed in its shipping container as soon as possible to reduce the chances of breaking. Cathode ray tubes should each be placed in their cartons with the large face end up and the neck down. Ensure that the weight of the CRT is not resting on the neck. The container should be sealed securely with strong tape and, to prevent tipping, turned over so the CRT is positioned face down.

Disarming Cathode Ray Tubes

Field personnel should not disarm cathode ray tubes. CRTs will be disarmed and disposed of in accordance with existing Environmental Protection Agency requirements at the plant to which they are returned.

Disposal of Cathode Ray Tubes

An Inventory/Distribution letter has been issued to the Branch Office with instructions on the disposal of CRTs.



Preface

This manual contains the information needed to service and maintain a Work Station that uses a 5379 Display, 5378 Display Attachment Unit (DAU), and an IBM Personal Computer AT System Unit.

The Maintenance Information manual describes the isolation and repair of any failure down to field replaceable unit (FRU) level. The manual also provides information on removing a failing FRU and installing another in its place.

The user should have had training on the IBM Personal Computer AT, and be familiar with a digital multimeter, IBM part 9900628 (or equivalent meter).

This manual is arranged as follows:

- Chapter 1. Introduction
- Chapter 2. Introduction to Problem Determination
- Chapter 3. Problem Isolation Charts (PICs)
- Chapter 4. Locations
- Chapter 5. Removal, Installation, and Adjustment Procedures
- Chapter 6. System Setup, Jumpers, and Switch Settings
- Chapter 7. Parts Catalog
- List of Abbreviations
- Glossary of Terms
- Index.

“Introduction to Problem Determination,” Chapter 2, gives explanations of the Power-On Self-Test (POST) and the Basic Assurance Tests (BATs), the menus for the advanced diagnostics, and how to load the advanced diagnostics diskette. When you have a failure symptom, this chapter aids you to select the correct problem isolation chart (PIC).

“Problem Isolation Charts,” Chapter 3, provide step-by-step instructions that aid in identifying a failing FRU. When the FRU has been identified, Chapter 5, “Removal, Installation, and Adjustment Procedures,” provides the necessary information to complete the repair. However for information on some system unit FRUs you may be directed to the “IBM Personal Computer AT *Hardware Maintenance and Service*,” for that information.

Because the work-station maintenance procedures are sequential operations (identify the element, identify the FRU, identify the component), the Index has also been made sequential for easy reference. The four-figure numbers in the brackets (SXXXX) at the start of the Index pertain to the removal procedures in Chapter 5. The corresponding installation reference is not given because it immediately follows each removal procedure to which it is the reverse sequence of operations.

The manual also provides operational instructions and hardware and design information that is necessary to locate the failing FRU. The operating instructions can be found in *IBM 3270 Personal Computer AT/GX: Guide to Operations*, SA33-3161, or *IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit*, SA33-3185.

Related Publications

- *IBM 3270 Personal Computer AT/GX: Guide to Operations*, SA33-3161, or *IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit*, SA33-3185.
- *IBM Personal Computer AT Hardware Maintenance and Service*.
- *IBM Personal Computer Hardware Reference Library, BASIC*, IBM Part 6025010.
- *IBM 7371 Color Plotter: Service Manual*, SY27-8035.
- *IBM 7374 Color Plotter: Service Manual*, SY27-8036.
- *IBM 7374 Color Plotter: Maintenance Information*, SY34-0315.
- *IBM 7374 Color Plotter: Parts Catalog*, S134-0106.
- *IBM 7375 Color Plotter: Maintenance Information*, SY34-0339.
- *IBM 7375 Color Plotter: Parts Catalog*, S134-0069.
- *IBM Cable System: Planning and Installation Guide*, GA27-3361.
- *IBM 5182 Color Printer: Hardware Maintenance and Service*, IBM Part 1502383.

If you need more copies of this publication, you can get them from your IBM representative, using the order number SY33-0132.



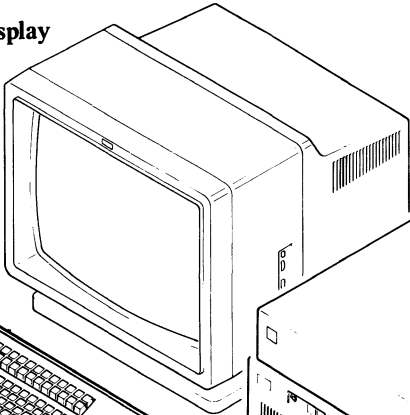
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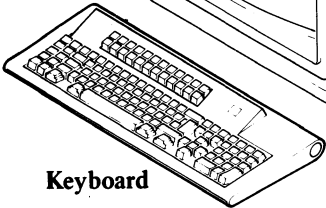
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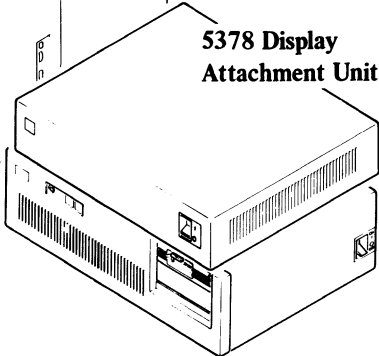
5379 Display



Keyboard



5378 Display Attachment Unit



5373 System Unit

Chapter 1. Introduction

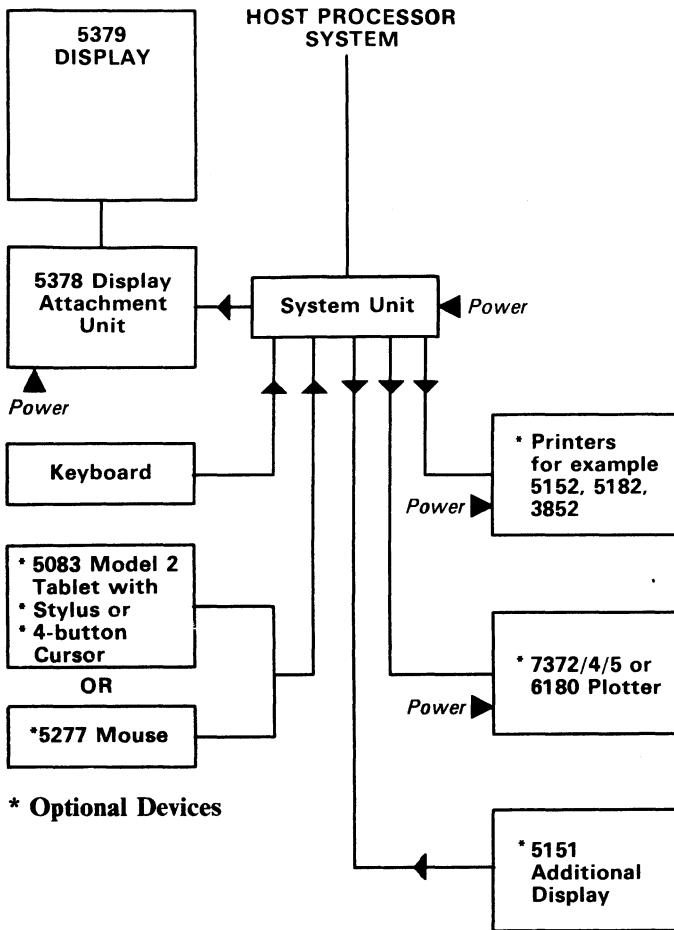
This manual gives the maintenance procedures for work stations that use a:

- IBM 5379 Display
- IBM 5378 Display Attachment Unit
- An IBM Personal Computer AT 5373 System Unit or a 5170 System Unit with the Display/Mouse/Tablet option installed
- IBM Keyboard
- Associated input devices, and interface adapters for output devices.

Details of the above units and devices are described on other pages of this chapter.

Power Supply Requirements

The work station operates on a power supply within the limits of 104 through 125 V ac, 47-63 Hz, or 200 through 240 V ac, 47-63 Hz.



Note: Either one of the Tablet or Mouse options can be attached, but not both.

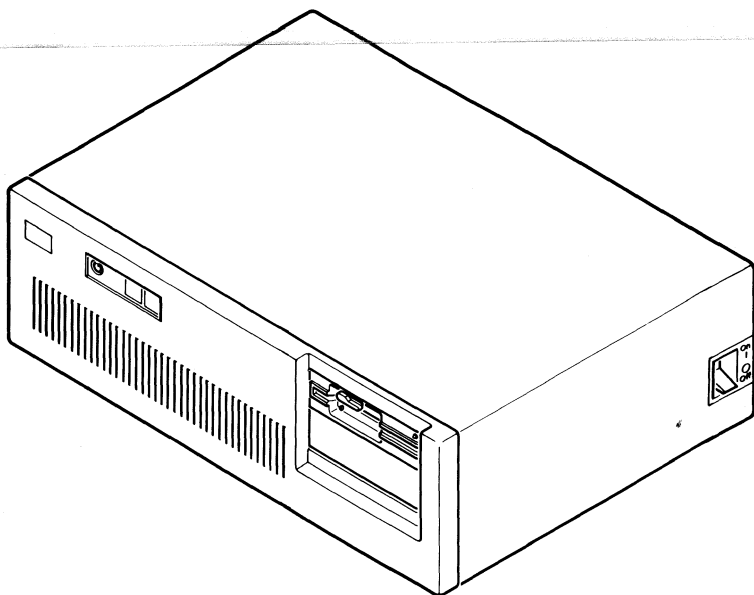


Figure 1-1. 5373 System Unit

IBM 5373 System Unit

Three models of the system unit are available, Model 160, Model 161, and Model 162.

All models include a display/mouse/tablet adapter card and support the attachment of a 3270 PC keyboard.

Model 160 has:

- A 512K-byte RAM on the system board
- A keyboard adapter that is part of the system board
- A fixed disk and diskette adapter
- A 1.2M-byte diskette drive
- A 20M-byte fixed disk unit
- A serial/parallel adapter.

Model 161 has:

- A 512K-byte RAM on the system board
- A memory expansion adapter card that provides 128K-bytes of memory
- A keyboard adapter that is part of the system board
- A fixed disk and diskette adapter
- A 1.2M-byte diskette drive
- A 20M-byte fixed disk unit
- A serial/parallel adapter
- A distributed function communications adapter (known also as the 3278/79 emulation adapter).

Model 162 has:

- A 512K-byte RAM on the system board
- A memory expansion adapter card that provides 512K-bytes of memory
- A keyboard adapter that is part of the system board
- A fixed disk and diskette adapter
- A 1.2M-byte diskette drive
- A 20M-byte fixed disk unit
- A serial/parallel adapter
- A distributed function communications adapter (known also as an emulation adapter)
- A math coprocessor.

Items that can be installed as options are given in the table starting on page 1-8.

Additional adapter cards for other optional devices can also be connected (see page 1-8).

Diskettes for 3270 PC GCP and IBM PC DOS are available.

Optional Features for the System Unit

Subject to certain limitations, various optional features can be attached to the system unit. This section briefly describes those features. The table starting on page 1-8 shows the **availability** of the features for each of the system unit models.

- **Serial/Parallel Interface**

This feature provides an additional parallel printer adapter interface and an EIA RS-232-C interface.

Note: The RS-232-C interface can be used only in Personal Computer sessions; it cannot be used during a host session.

- **GPIB (IEEE-488) Adapter Card**

This feature provides an interface for the attachment of IBM 7371, 7372, 7374, or 7375 Color Plotters to the work station. Devices other than these IBM plotters may be attached to this adapter provided they have the same interface characteristics, but in such a case the user is responsible for device control programming. Up to 13 devices (IBM or non-IBM) can be attached to the GPIB (IEEE-488) interface. Only one device, however, can be accessed at any one time.

- **Memory Expansion Features**

These features allow the memory capacity of the system unit to be extended (see the table starting on page 1-8).

- **Diskette and Fixed-Disk Drives**

These features allow the diskette or disk storage of the work station to be expanded (see the table starting on page 1-8).

- **Intel 80287 Math Coprocessor**

The Intel¹ Math Coprocessor is a microprocessor that can be installed on the system board of the system unit.

¹ Trademark of Intel Corporation

Availability of Features for the 5373 System Unit

Feature Name	5373 System Unit		
	Model 160	Model 161	Model 162
Monochrome display/printer adapter	Opt	Opt	Opt
GPIB (IEEE-488) card	Opt	Opt	Opt
Serial/parallel interface (parallel printer adapter and EIA RS-232-C) (See Note 1 below)	Std	Std	Std
128K-byte memory expansion option	Opt	Std	Opt
512K-byte memory expansion option (See Note 2 below)	Opt	Opt	Std
512K-byte EMA extended memory adapter	Opt	Opt	Opt

Legend:

Opt - optional

Std - provided as standard

Notes:

1. *Up to two serial/parallel adapters can be installed.*
2. *One adapter is standard on Model 162 but up to four adapters can be installed on all models as options, depending on the availability of adapter slots in the system unit.*

The table is continued on page 1-9.

Availability of Features for the 5373 System Unit (Continued)

Feature Name	5373 System Unit		
	Model 160	Model 161	Model 162
320/360K-byte double-sided diskette drive (See Note 1 below)	Opt	Opt	Opt
1.2M-byte high-capacity diskette drive (See Note 1 below)	Std	Std	Std
20M-byte fixed-disk drive (See Note 1 below)	Std	Std	Std
Intel 80287 Math Coprocessor	Opt	Opt	Std
Distributed Function Communications Adapter (3278/79 Emulation Adapter) (See Note 2 below)	Opt	Std	Std
System/36 Adapter	Opt	Opt	Opt

Legend:

Opt - optional

Std - provided as standard

Notes:

1. *Maximum diskette/disk configuration can be:*

- *Two diskettes (2 x 1.2Mb or 1 x 1.2Mb and 1 x 360Kb) and one fixed disk, or*
- *One diskette (1.2Mb only) and two fixed disks.*

2. *Originally called 3270 System Adapter.*

IBM 5170 System Unit

| The 5378 Display Attachment Unit and the 5379 Display
| may also be used with the IBM Personal Computer AT
| System Unit (5170). The attachment is through the
| Display/Mouse/Tablet (DMT) option, and may be
| configured with the same options as the 5373 System Unit.

| Expansion memory for the 5170 system unit with the
| display/mouse/tablet option, is the same as for any other
| IBM Personal Computer AT system unit.

| The difference between the 5170 and the 5373 system units
| is that Even-Megabyte-Aligned (EMA) extended memory is
| available only on the 5373 system unit.

Screen Menus

The content of some screen menus shown in this manual
may vary from those shown on your screen, which are
dependent on the configuration of the work station.

Language Differences

The content of screens generated by advanced diagnostics
diskettes may appear in your national language.

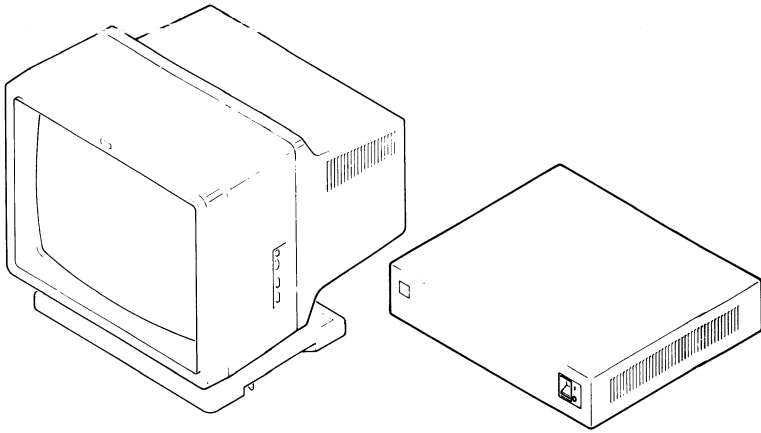


Figure 1-2. 5379 Display and 5378 Display Attachment Unit

IBM 5379 Display Units

The display units available are the 5379 C01 356-mm (19-inch) color display, or the 5379 M01 356-mm (19-inch) monochrome display.

Each display unit has a tilt and swivel mechanism.

The display screens have an addressable array of 1024 x 1024 encoded points (picture elements (pels), refreshed at 57 frames per second.

Cleaning the Screen

Warning: Do not use acid solutions or abrasive materials to clean the screen (display surface) because they will damage the nonreflective coating.

Perform the following:

Power Off the work station, see page 1-17. Wipe the screen using a soft cloth moistened with either:

- A recommended screen cleaner (IBM part 7034436)
- Water only
- Water and detergent, then water only, or
- Ammonia-based glass cleaner.

Dry the screen with a soft cloth before switching on the 5379 display.

IBM 5378 Display Attachment Unit (DAU)

The 5378 DAU models available are the 5378 C01 DAU for the color display, or a 5378 M01 DAU for the 5379 M01 monochrome display.

The DAU is connected to the system unit by a 62-way bus extender cable.

The DAU contains a power supply unit that provides dc voltages of +5 V, -5 V, +12 V, -12 V, and a logic gate that can contain up to eight, 4-wide by 3-high logic cards.

The logic cards contained in the gate are:

- Display bus receiver card
- Graphics processor card
- System control card
- Update control card
- Clock and video driver card
- Up to three bit-plane cards.

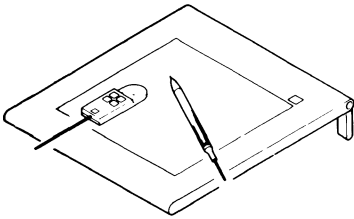
All power and signal connections to and from the DAU are made through the input/output panel at the rear of the DAU.

The On/Off switch on the front panel of the DAU controls the mainline power to the 5379 display.

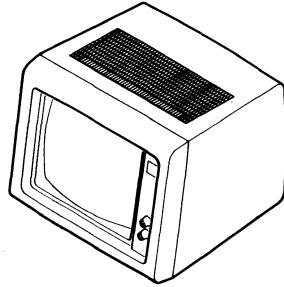
Warning: The correct power-on and power-off sequences must be observed at all times.

IBM Input/Output Devices

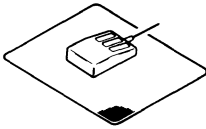
One or more of input/output devices similar to the following may be attached to the system unit.



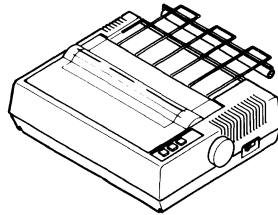
5083 Model 2 Tablet with Stylus or 4-Button Cursor



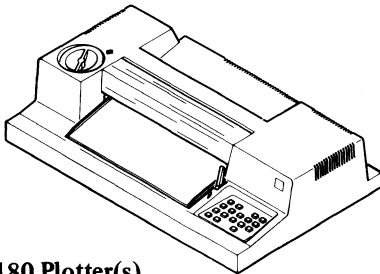
5151 Additional Screen



5277 Mouse and Pad

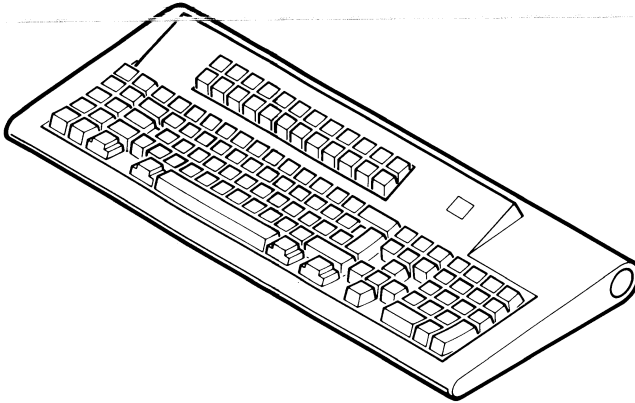


Color Printer



7372/4/5 or 6180 Plotter(s)

Figure 1-3. Optional Attachments for an IBM Personal Computer AT/GX Work Station



- **Keyboards**

The following table shows the possible combinations of keyboards and system units used on the workstation.

Keyboard language options are U.S. – English and 5 major languages.

Keyboard	System Unit Type Number		
	5373 (All models)	5170 with 5373 FC 7002 Option Kit	5170 with 5170 FC 7012 Option Kit
IBM 3270 PC Keyboard	Yes*	Yes*	No
IBM 3270 PC APL Keyboard	Yes*	Yes*	No
IBM PC-AT Keyboard	Yes	Yes	All 5170 models, excluding Model 339
IBM Enhanced PC Keyboard	No	No	5170 Model 339 only

* Note: IBM 3270 PC Keyboard Adapter Cable, (IBM Part 1887915) also required for these configurations.

- **Cables**
- **Tablet** – A graphics input device attached to the system unit and controlled from a stylus or 4-button cursor (optional device)
- **Mouse** – graphics input device attached to system unit (optional device)
- **Printer** – attached to system unit (optional device)
- **Plotter** – attached to system unit (optional device)
- **5151 (additional) monochrome display** (optional device).

The On/Off switch on the front panel of the DAU controls the mainline power to the 5379 display.

Warning: The correct power-on and power-off sequences must be observed at all times.

- **Power-Off Sequence**

Reference to this sequence in other chapters of this manual means: **Power off the work station in the correct sequence (system unit first) to avoid possible loss of messages.**

1. Power off the system unit.
2. Power off the 5378 display attachment unit.
3. Disconnect the system unit and 5378 DAU power cables from the mainline power outlets.

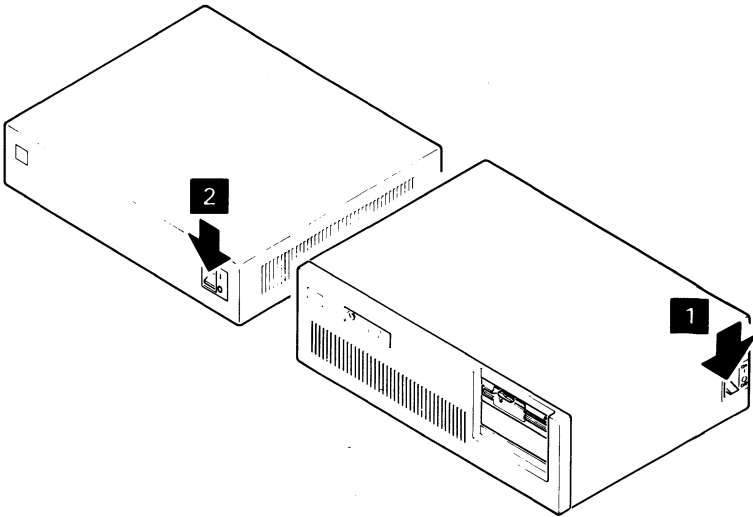


Figure 1-4. Power Switches – Power-Off Sequence

- **Power-On Sequence**

Reference to this sequence in other chapters of this manual means: **Power on the work station in the correct sequence (system unit last).**

1. Connect the system unit and 5378 DAU power cables to the mainline power outlets.
2. Power on the 5378 display attachment unit.
3. Power on the system unit.

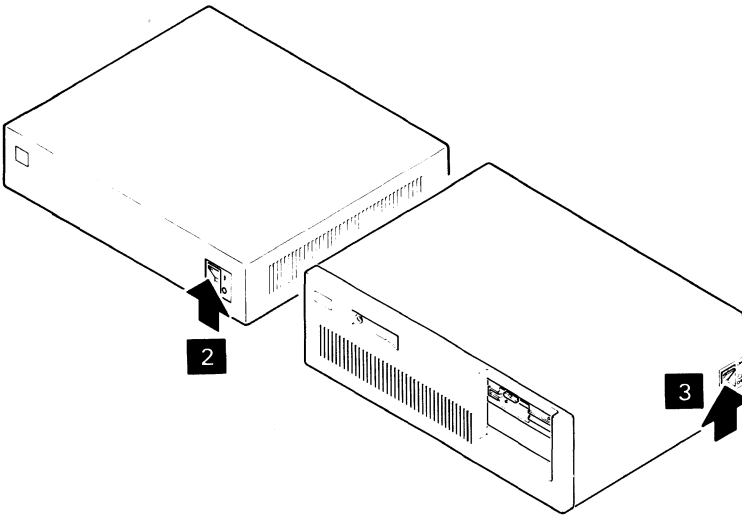


Figure 1-5. Power Switches – Power-On Sequence

Chapter 2. Introduction to Problem Determination

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This chapter gives an explanation of four main diagnostic aids:

- Basic assurance tests (BATs)
- Power-on self-test (POST)
- Problem isolation charts (PICs) and
- Advanced diagnostics.

It is not necessary to go through this chapter on every service call, but it is a useful reference until you are familiar with using these aids.

It is recommended that you go through BATs, POST, and then advanced diagnostics each time you service the IBM work station or add an option to it.

Instruction on screen to press Enter

In problem determination procedures, whenever an instruction appears on the screen to press the Enter key, you may, instead, press the  key as stated in the text.

5378 Basic Assurance Tests (BATs)

The BATs check the following components of the 5378 Display Attachment Unit (DAU):

- Display bus receiver card (DBR)
- Graphics processor card (GP)
- Update control card (UC)
- System control card (SC)
- Bit-plane cards (BP0/1 - 2/3 - 4/5)
- Clock and video driver card (CVD).

The BATs run each time the DAU is switched on. If the system unit is either switched off, or disconnected from the 5378 DAU, the BATs run independently of POST. A series of test patterns is displayed on the screen to indicate that the BATs completed successfully.

If the 5378 DAU is switched on and connected to a system unit that is also switched on, the system unit controls the BATs. When the BATs are running, the test patterns are suppressed and not displayed on the screen.

If an error occurs, the BATs attempt to write an error message (in this form: **44XX (XXXX)**) on to the screen and signal the system unit which gives an audible warning (one long beep and two short beeps).

System Unit Power-On Self-Test (POST)

The POST runs each time the system unit is switched on. The POST sequence takes between 1 and 2 minutes to complete, relative to the amount of memory installed.

Short tests check the following items (if installed):

5378 DAU (see BATs)

System board

Memory

Keyboard adapter

Diskette drive

Fixed disk drive

Display/mouse/tablet adapter

(This card includes a hexadecimal LED to display the diagnostic progress messages.)

Distributed function communications adapter.

The system unit gives one short beep when POST completes, whether or not the test was successful.

Display adapter and DAU errors are indicated by one long and two short beeps.

For other errors the system unit gives two short beeps, shows an error message on the screen, and the message **ERROR. (RESUME = "F1" KEY).**

Press the **PF1** key to continue working when this message appears.

Hexadecimal LEDs

The hexadecimal LED located on the display/mouse/tablet adapter card in the system unit is used to display diagnostic progress and error messages.

The normal sequence on the LED during POST is:

1. The numbers 0 through F are displayed with both decimal points lit, while the display/mouse/tablet adapter card is being tested. This also provides a visual test of the LED itself.
2. The numbers 0 through D are displayed with no decimal points lit as each of the tests (0 through D) are run. (Some of the tests have a very short test cycle, this means the number may be displayed too quickly to be seen by the operator.)
3. The LED goes blank when all tests 0 through D have completed successfully.

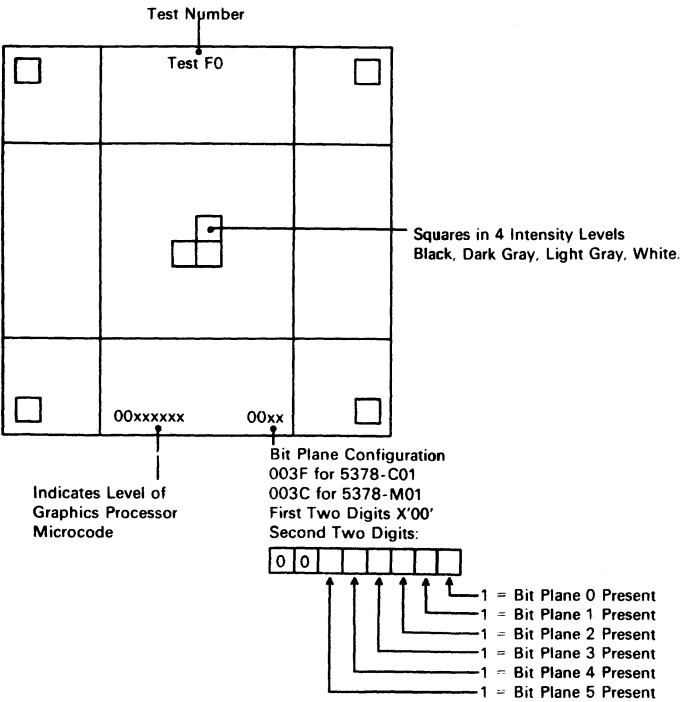
When an error condition occurs while one of the tests (0 through D) is running, the LED blinks the last four characters of the error code. (The first four characters of the error code are always 44x0.) The last four characters are blinked in turn on the LED (with a short blank period between each character) followed by a larger blank period at the end of the sequence.

This sequence is repeated 4 times, then the number of the test that failed remains displayed on the LED.

Test Patterns

Test Pattern F0 Description (Monochrome Graphics Mode)

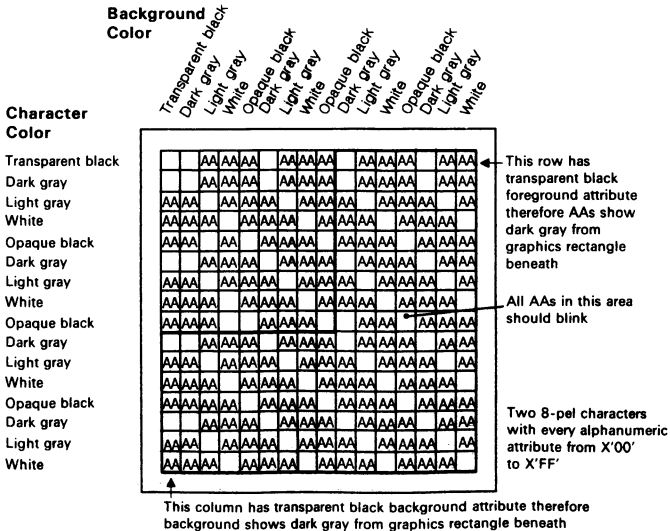
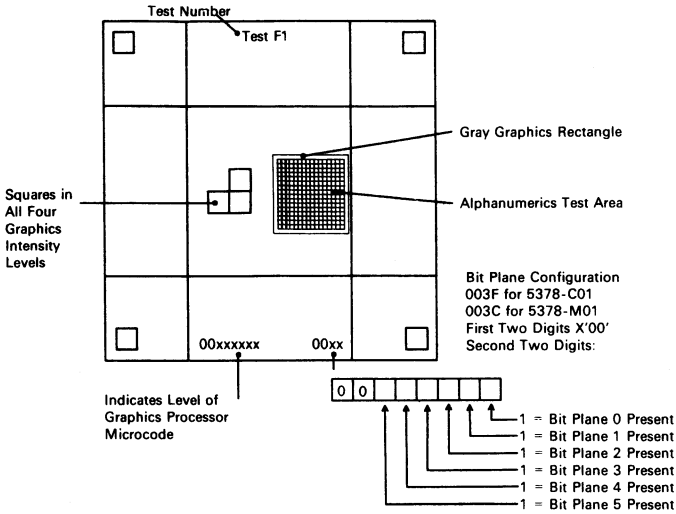
Note: For the required color/monochrome screen presentation of the test pattern see *IBM 3270 Personal Computer AT/GX: Guide to Operations, SA33-3161*, or *IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit, SA33-3185*.



Note: The level of Graphics Processor Microcode must be at least 12.9 for AT-attachment. Level 12.9 is required for GCP-II, level 13.0 for GCP-III, and level 14.0 for GCP-III.II

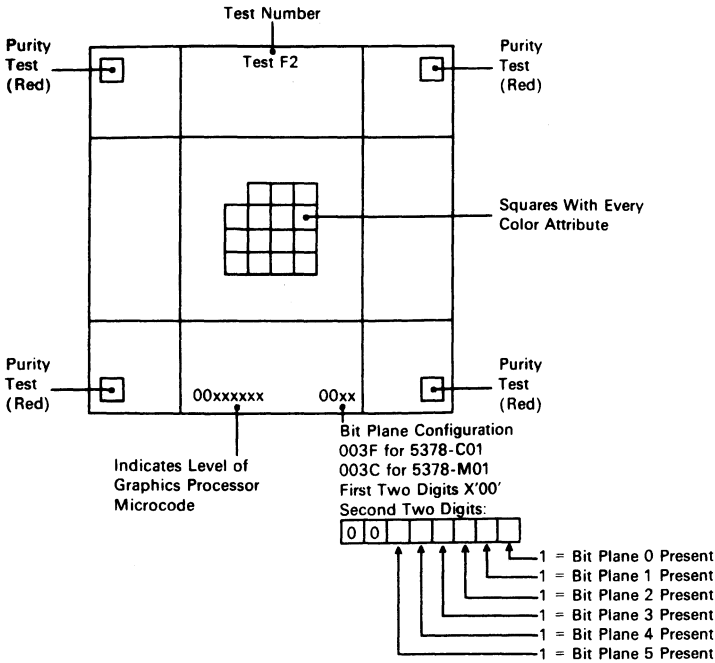
Test Pattern F1 Description (Monochrome Graphics and Alphanumeric Mode)

Note: For the required color/monochrome screen presentation of the test pattern see *IBM 3270 Personal Computer AT/GX: Guide to Operations, SA33-3161*, or *IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit, SA33-3185*.



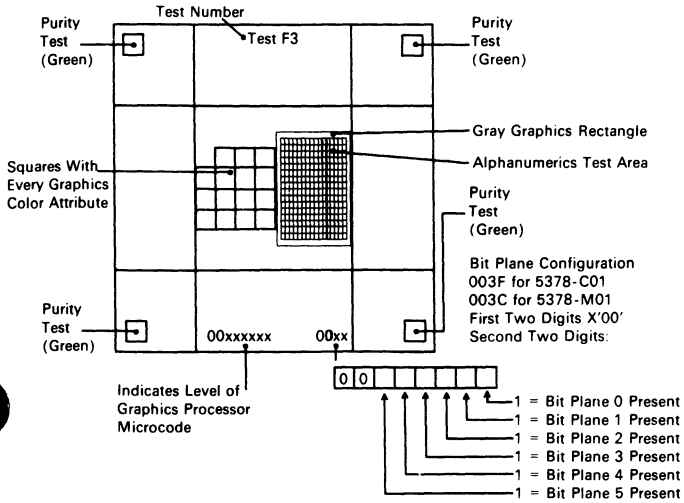
Test Pattern F2 Description (16-Color Graphics Mode)

Note: For the required color screen presentation of the test pattern see *IBM 3270 Personal Computer AT/GX: Guide to Operations, SA33-3161*, or *IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit, SA33-3185*.



Test Pattern F3 Description (16-Color Graphics and Alphanumeric Mode)

Note: For the required color screen presentation of the test pattern see *IBM 3270 Personal Computer AT/GX: Guide to Operations, SA33-3161*, or *IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit, SA33-3185*.

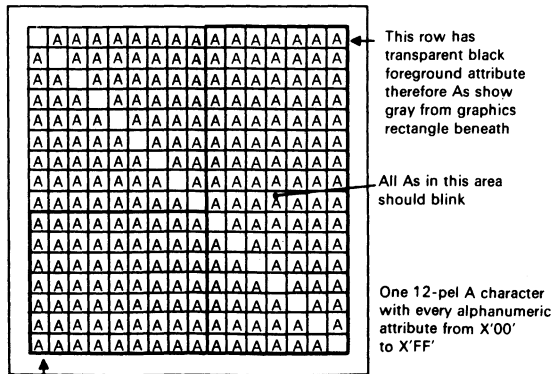


Background Color

- Transparent black
- Red
- Green
- Yellow
- Blue
- Magenta
- Cyan
- White
- Opaque black
- Red
- Green
- Yellow
- Blue
- Magenta
- Cyan
- White

Character Color

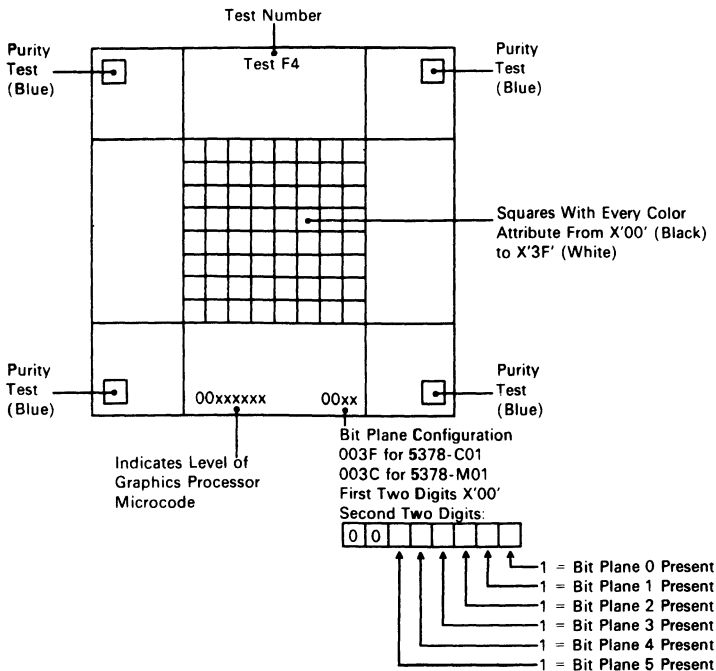
- Transparent black
- Red
- Green
- Yellow
- Blue
- Magenta
- Cyan
- White
- Opaque black
- Red
- Green
- Yellow
- Blue
- Magenta
- Cyan
- White



This column has transparent black background attribute therefore background shows gray from graphics rectangle beneath

Test Pattern F4 Description (64-Color Graphics Mode)

Note: For the required color screen presentation of the test pattern see *IBM 3270 Personal Computer AT/GX: Guide to Operations, SA33-3161*, or *IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit, SA33-3185*.



How to Start POST

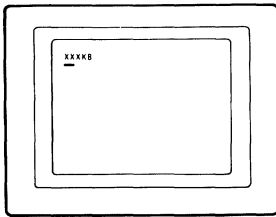
1. Check that all units and input devices are powered Off.
2. Set the DAU and any external devices (for example, printers or plotters) to On. Set the power switch of the system unit to On.
3. Turn the 5379 brightness control fully clockwise.
4. If a 5151 additional display is installed, turn its brightness and contrast control fully clockwise.
5. Messages **TESTXX** flash on the 5379 screen.
6. The message **4400** appears for a short time on the screen.
7. While the memory is being tested, the amount of memory already tested is displayed in **white on a black background** near the top-left-hand corner of the screen. The memory size increases in 64K-byte amounts while the test is running. The cursor appears under the first digit.
8. One short beep sounds when POST completes, whether or not the last test was successful.
9. The first screen of the application program is displayed.

Note: If no application program or operating system was loaded from a diskette or fixed disk, the IBM Personal Computer BASIC screen is displayed.

Notes:

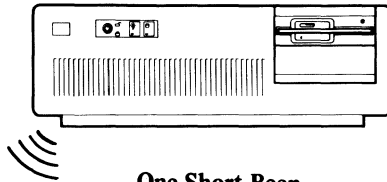
- 1. The sequence of responses 1, 2, and 3, indicates that the power-on self-test has completed successfully.*
- 2. Check the setup information in the IBM 3270 Personal Computer AT/GX: Guide to Operations, SA33-3161, or IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit, SA33-3185. for the amount of memory installed in the system unit.*

1



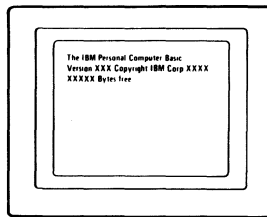
Memory Test

2



One Short Beep

3



Basic Screen

Figure 2-1. POST System Responses

If the system unit fails to complete POST, you could receive a wrong audio response, a blank screen, or an error message that remains on the screen. You should look for these messages and make a note of them as soon as they appear. If multiple errors occur, you should troubleshoot the one that appears first.

POST Errors

Whenever a POST failure occurs, always ensure that all cables are correctly connected and that all jumpers and switch settings are correct. Switch locations are in Chapter 4, "Locations" on page 4-1 and switch settings are in Chapter 6, "System Setup, Jumpers, and Switch Settings" on page 6-1.

The following are some of the errors symptoms or codes you may receive while POST is running:

- A blank display
- A wrong audio response (no beep or more than one beep)
- An error message such as:

601
or **XXXXXX XXXX 201** (X means any character could appear)
or **1701**
or **44XX (XXXX)**
or even a combination such as:
300000 0000 201
601

If a combination of error codes appears, always troubleshoot the error code that appears first unless instructed to do differently. Make a note of all error codes that may be displayed and any audio response that you hear.

After an error code appears on the screen, the next line displayed is:

(RESUME = "F1" KEY)

If you press the PF1 key, the system unit bypasses the error and attempts to complete POST. The error may or may not let POST complete. If POST is permitted to complete, you may be able to load the advanced diagnostics diskette. This is very important because many of the PICs ask you to load the advanced diagnostics

diskette which gives you better problem isolation than POST.

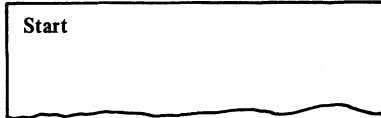
Note: If you receive any error indications while running or at the completion of POST, your next step will always be to note the error and then go to "Start" on page 3-2.

Problem Isolation Charts (PICs)

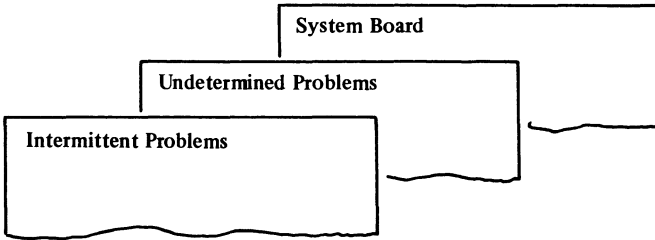
How to use



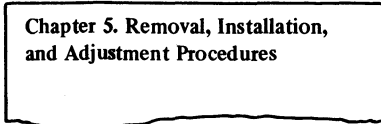
Always begin with "Start" on page 3-2



Depending on your failure indications, "Start" directs you to one of the PICs.

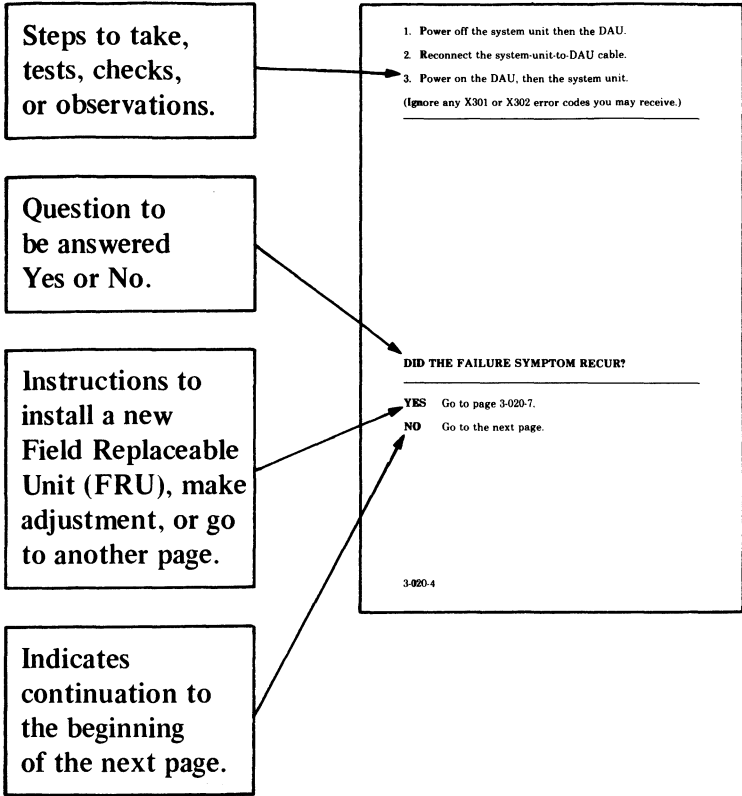


These PICs will guide you through a series of steps and the use of the Diagnostics diskette to identify the failing FRU.



Chapter 5 guides you to complete the repair.

The example below shows a sample page from the PICs.



Advanced Diagnostics

Note: The advanced diagnostic tests are on the diskette that is in the back of this manual. You should make a copy of this diskette and put the original in a safe place.

There are two ways to load the advanced diagnostics.

If your personal computer is switched to Off:

1. Insert the advanced diagnostics diskette in drive A and rotate the load lever downward.
2. Power on the DAU.
3. Set the system unit power switch to On.
4. When POST completes, the advanced diagnostics load and Menu 2 appears on the 5379 screen.

If your personal computer is switched to On:

1. Insert the advanced diagnostics diskette in drive A and rotate the load lever downward.
2. Press and hold **Ctrl** and **Alt**, then press **Del**. Release all three keys.
3. The advanced diagnostics load and menu 2 appears on the 5379 screen.

Special Key Functions

Keys with special functions for the advanced diagnostics test are:

PF1 forces the system unit to bypass an error and continue with POST.

Ctrl and **P** together directs screen output to the printer.

Ctrl and **N** together cancels output to the printer.

Ctrl and **C** together stops advanced diagnostic tests and returns to the installed devices menu.

Ctrl and **S** together stops the advanced diagnostic tests. (Press any key to continue.)

Shift and **PrtSc** together prints what is currently on the screen (useful when the screen is not readable).

Advanced Diagnostics Menu Reference

The next three pages show each of the advanced diagnostic menus and the paths to and from each of them.

MENU 1*

The IBM 3270 Personal Computer with 5270 or 5370 Display
ADVANCED DIAGNOSTICS
 Version X.XX
 (C)Copyright IBM Corp.
 1981, 1982, 1983, 1984, 1985

PC/AT SETUP PROGRAM

Have you completed running this Setup program since connecting the battery (Y/N).

Type Y or N, then press "Enter"
 ? _

MENU 2

The IBM 3270 Personal Computer with 5270 or 6370 Display
ADVANCED DIAGNOSTICS
 Version X.XX
 (C)Copyright IBM Corp.
 1981, 1982, 1983, 1984, 1985

SELECT AN OPTION

0 - SYSTEM CHECKOUT
 1 - FORMAT DISKETTE
 2 - COPY DISKETTE
 3 - PREPARE SYSTEM FOR MOVING
 4 - SETUP
 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED
 ? _

MENU 3

THE INSTALLED DEVICES ARE

1 - SYSTEM BOARD
 2 - XXXXXB MEMORY
 3 - KEYBOARD
 6 - X DISKETTE DRIVE(S) AND ADAPTER
 9 - SERIAL/PARALLEL ADAPTER
 PARALLEL PORT
 11 - SERIAL/PARALLEL ADAPTER
 SERIAL PORT
 14 - GRAPHICS PRINTER
 17 - X FIXED DISK DRIVE(S) AND ADAPTER
 44 - GRAPHICS DISPLAY/ATTACHMENT UNIT
 AND TABLET (MOUSE) ADAPTER

IS THE LIST CORRECT (Y/N)
 ? _

MENU 4

SYSTEM CHECKOUT

0 - RUN TESTS ONE TIME
 1 - RUN TESTS MULTIPLE TIMES
 2 - LOG UTILITIES
 9 - END SYSTEM CHECKOUT

SELECT THE ACTION DESIRED
 ? _

PAGE 2-19

PAGE 2-20

MENU 6

LOG UTILITIES

0 - START ERROR LOG
 1 - STOP ERROR LOG
 2 - LIST LOG
 3 - SET TIME OF DAY
 4 - DISPLAY TIME OF DAY
 9 - RETURN FROM UTILITIES

ENTER THE ACTION DESIRED
 ? _

* Note: Menu 1 will only be displayed if the Battery is defective.

Note: For all ENTER instructions on the screen, press the ↵ key.

RUN TESTS ONE TIME Menus

MENU 5

- 1 - SYSTEM BOARD
- 2 - XXXXXX MEMORY
- 3 - KEYBOARD
- 4 - MONOCHROME DISPLAY & PRINTER ADAPTER
- 8 - X DISKETTE DRIVE(S) AND ADAPTER
- 9 - SERIAL/PARALLEL ADAPTER
 - PARALLEL PORT
- 11 - SERIAL/PARALLEL ADAPTER
 - SERIAL PORT
- 14 - GRAPHICS PRINTER
- 17 - X FIXED DISK DRIVE(S) AND ADAPTER
- 44 - GRAPHICS DISPLAY/ATTACHMENT UNIT AND DISPLAY/MOUSE/TABLET ADAPTER

SELECT OPTION NUMBER(S) TO TEST OR
PRESS "ENTER" TO SELECT ALL OPTIONS
? _

4 selected

→ MENU 7A

44 selected

→ MENU 8A

6 selected

→ MENU 9

17 selected

→ MENU 10

MENU 7A

IBM MONOCHROME DISPLAY AND PRINTER ADAPTER TEST

- 8 - DISPLAY ADAPTER TEST
- 1 - DISPLAY ATTRIBUTES
- 2 - CHARACTER SET
- 3 - BOXES DISPLAY
- 4 - PRINTER ADAPTER TEST
- 9 - EXIT TO MAIN MENU
- 10 - RUN ALL ABOVE TESTS
- 11 - VIDEO TEST
- 12 - SYNC TEST

ENTER NUMBER OF DESIRED ACTION _

MENU 8A

GRAPHICS DISPLAY ATTACHMENT UNIT TEST

- 8 - PC NON-INTERACTIVE TEST
- 1 - RUN ALL DISPLAY UNIT TESTS
- 2 - TEST PICTURE A
- 3 - TEST PICTURE B
- 7 - DISPLAY UNIT ADAPTER
- 8 - EXTENDED MEMORY ADAPTER
- 9 - EXIT TO MAIN MENU
- 10 - RUN ALL ABOVE TESTS
- 11 - SELECT ONE DISPLAY UNIT TEST

ENTER NUMBERS OF DESIRED ACTION _

MENU 9

TESTING - 1 DISKETTE DRIVE(S) & ADAPTER

- | OPTION | DRIVE |
|-------------------------------|-----------|
| 1 - SEQUENTIAL ACCESS | ONE DRIVE |
| 2 - RANDOM SEEK | ONE DRIVE |
| 3 - VERIFY DISKETTE | ONE DRIVE |
| 4 - SPEED TEST | ONE DRIVE |
| 5 - DSKT CHANGE TEST | ONE DRIVE |
| 9 - RETURN TO CONTROL PROGRAM | |

FOR OPTION 9
PRESS "9" and "ENTER"
FOR OTHER OPTIONS (1 THRU 5)
ENTER OPTION, DRIVE AND "ENTER"
? _

MENU 10

FIXED DISK DIAGNOSTIC MENU

- 1 - WRITE, READ, COMPARE (TEST CYLINDER)
- 2 - SEEK TEST
- 3 - HEAD SELECT
- 4 - SURF DETECTION AND CORRECTION
- 5 - RUN ALL TESTS
- 6 - HEAD VERIFY
- 7 - FORMAT MENU
- 9 - RETURN TO CONTROL PROGRAM

FOR OPTION 8
PRESS "8" and "ENTER"

FOR OTHER OPTIONS
ENTER OPTION, DRIVE(1, C), AND "ENTER"
? _

Note: For all ENTER instructions on the screen, press the ↵ key

RUN TESTS MULTIPLE TIMES

Menus

MENU 5

1 - SYSTEM BOARD
2 - XXXXXK MEMORY
3 - KEYBOARD
4 - MONOCHROME DISPLAY & PRINTER ADAPTER
6 - X DISKETTE DRIVE(S) AND ADAPTER
9 - SERIAL/PARALLEL ADAPTER
 - PARALLEL PORT
11 - SERIAL/PARALLEL ADAPTER
 - SERIAL PORT
16 - GRAPHICS PRINTER
17 - X FIXED DISK DRIVE(S) AND ADAPTER
44 - GRAPHICS DISPLAY/ATTACHMENT UNIT AND
 DISPLAY/MOUSE/TABLET ADAPTER

SELECT OPTION NUMBER(S) TO TEST OR
PRESS "ENTER" TO SELECT ALL OPTIONS
? _

4 selected

MENU 7B

44 selected

MENU 8B

MENU 7B

CHOOSE OPTIONS FOR UNATTENDED MODE
IBM MONOCHROME DISPLAY AND
PRINTER ADAPTER TEST

0 - DISPLAY ADAPTER TEST
1 - DISPLAY ATTRIBUTES
2 - CHARACTER SET
3 - BOX2S DISPLAY
4 - PRINTER ADAPTER TEST
9 - EXIT TO MAIN MENU
10 - RUN ALL ABOVE TESTS


ENTER NUMBERS SEPERATED BY COMMAS

MENU 8B

CHOOSE OPTIONS FOR UNATTENDED MODE
GRAPHICS DISPLAY/ATTACHMENT UNIT TEST

0 - PC NON-INTERACTIVE TEST
1 - RUN ALL DISPLAY UNIT TESTS
2 - TEST PICTURE A
3 - TEST PICTURE B
7 - DISPLAY UNIT ADAPTER
9 - EXIT TO MAIN MENU
10 - RUN ALL ABOVE TESTS

ENTER NUMBERS SEPERATED BY COMMAS

Note: For all ENTER instructions on the screen, press the  key

Menu 9 – Diskette Drive and Adapter

This menu allows you to test the diskette drives and the diskette drive portion of the Fixed Disk and Diskette Drive adapter.

**TESTING – X DISKETTE DRIVE(S)
AND ADAPTER
DISKETTE DIAGNOSTICS MENU**

OPTION	DRIVE
1 – SEQUENTIAL ACCESS	ONE DRIVE
2 – RANDOM SEEK	ONE DRIVE
3 – VERIFY DISKETTE	ONE DRIVE
4 – SPEED TEST	ONE DRIVE
5 – DSKT CHANGE TEST	ONE DRIVE
9 – RETURN TO CONTROL PROGRAM	

**FOR OPTION 9
PRESS "9" and "ENTER"
FOR OTHER OPTIONS (1 THRU 5)**

**TYPE THE OPTION NUMBER,
DRIVE ID (1,A) AND PRESS "ENTER"**

1 – SEQUENTIAL ACCESS: Tests the basic diskette operations, including a sequential write, read, and comparison of data on all sectors of the diskette.

2 – RANDOM SEEK: Tests the basic diskette operations, including a series of 50 random seeks, each seek being followed by a write, read, and comparison of data.

3 – VERIFY DISKETTE: Verifies data accessing and each sector.

4 – SPEED TEST: Measures the time required for one revolution of the diskette.

Running a Single DAU Test or Test Pattern from the Advanced Diagnostics Diskette

- Power off the system unit.
- Insert the advanced diagnostics diskette in drive A of the system unit and rotate the load lever downward.
- Power on the work station correctly (system unit last).
- Wait for up to two minutes for the diskette to stop turning and the diskette drive LED to go Off.
- Review the advanced diagnostics menu reference on page 2-19.
- Press PF1 if instructed (on the screen).
- The advanced diagnostics start screen (Menu 2) is displayed on the 5379.
- Press 0, then **←** to run advanced diagnostic routines. (You may be requested by the screen to answer questions relating to attached devices.)
- When Menu 3 is displayed, press Y, then **←**.
- When Menu 4 is displayed, press O, then **←** to run tests one time.
- When Menu 5 is displayed, key 44, then press **←** to select graphics display/control unit.
- When Menu 8A is displayed, key 11, then press **←** to select one display unit test.

Any DAU test (including the test patterns) can now be selected by keying the test or pattern number, then pressing **←**.

Press Y or N, then **←** to answer the question on whether you want to loop the test.

Press Y or N, then **←** to answer the question on whether you want to stop on error.

To end the display of a pattern, press **←**.

Tests Available

The tests available are:

- 0 Display bus receiver tests (by system unit)
- 1 Graphics processor tests
- 2 Shared storage test (by system unit)
- 3 Update control tests
- 4 System control tests
- (5 and 6 reserved)
- 7 Basic bit plane tests
- (8 reserved)
- 9 Shared storage test (by graphics processor)
- (A reserved)
- B Comprehensive bit plane tests
- C System unit/graphics processor interaction tests
- (D, E, and F reserved).

Test Patterns Available

The test patterns available are:

- F0 Monochrome graphics mode
- F1 Monochrome graphics and alphanumerics mode
- F2 16 color graphics mode
- F3 16 color graphics and alphanumerics mode
- F4 64 color graphics mode
- (F5 through F8 reserved).

Alignment Patterns Available

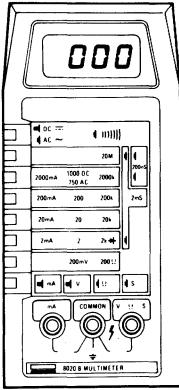
The alignment patterns available are:

- F9 Overlapping primary color squares
- FA White square in center of screen
- FB Red full screen
- FC No display
- FD Screen full of characters
- (FE and FF reserved).

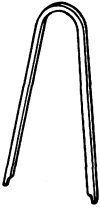
Diagnostic Tools

The following special tools are needed to service the personal computer AT/GX.

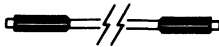
- A. A digital multimeter (IBM part 9900628) or similar multimeter.



- B. A tweezer-type module puller IBM part 9900764 or one similar the one shown below. (Used for removal of the memory modules.)



- C. Jumper for probing the logic card connectors (IBM part 452655).

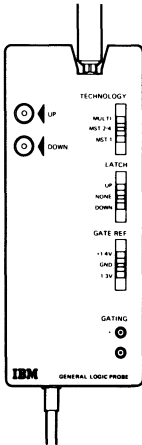


D. General logic probe (IBM part 453212)

To use the General Logic Probe (GLP), IBM part 453212, set the switches as follows:

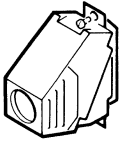
Technology	MULTI
Latch	NONE
Gate Ref.	GND

Power the probe from any D03 pin (red wire + 5 V) and any D08 pin (black wire, ground). The ground lead on the probe tip must also be connected to a ground near the test point. Test GLP operation by probing on D03 and then D08.

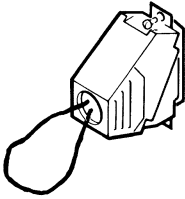


- E.** A diskette for write-tests.
Any data on the diskette is lost when the write-tests are run.
- F.** Advanced Diagnostics diskette (shipped with this manual).

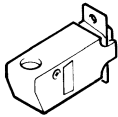
G. Printer wrap plug* (IBM part 8529228).



H. IBM communications adapter wrap plug (IBM part 8529280) (if the adapter is installed)*.



I. IBM serial port wrap plug (IBM part 8286126) (if the serial/parallel adapter is installed)*.



* These items are supplied with the system unit and shipped with the IBM Personal Computer AT *Hardware Maintenance and Service*.

Chapter 3. Problem Isolation Charts

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Start

This is the entry point for using all the problem isolation charts (PICs). You may have an error code, audible error during power-on self-test (POST), an undetermined problem, or a problem that pertains to one device.


Notes:

1. **Advanced diagnostics displayed on the screen may appear in your user's national language.**
2. *It is assumed that the failing element has been identified. If it has not, go to IBM 3270 Personal Computer AT/GX: Guide to Operations, SA33-3161, or IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit, SA33-3185, to identify the failing element before returning to here.*

DANGER

Switch Off all mainline power from the work station before removing or installing FRUs, cables or other components, or before attempting to service any component that is not correctly installed.

Before starting work on the 5379 display or its associated components, read and observe the CRT and EHT safety procedures given at the front of this manual.

3. *If you are returning to here from a PIC without solving the problem and the original symptom has not changed, go to page 3-020-1, "Undetermined Problems."*
4. **In problem determination procedures, whenever a screen instruction is given to press the Enter key, you may, instead, press the  key as stated in the text.**

Power off the work station in the correct sequence (system unit first).

Review Chapter 4, "Locations" and Chapter 6, "System Setup, Jumpers, and Switch Settings" to ensure that the switches in your work station are set correctly for the options installed.

| *Note:*

- | • Expansion memory is normally contiguous from address 1M upward. (M equals 1,048,576 bytes.)
- | • IBM 5373 System Units only.
 - | 1. The expansion memory can be configured as Even-Megabyte-Aligned (EMA).
 - | 2. It is important to verify if EMA extended memory is installed before trying to diagnose a memory problem.
 - | 3. The switch settings on memory expansion options determine if they are configured as EMA extended memory. Check your expansion memory option switch settings against those shown in IBM Personal Computer AT *Hardware Maintenance and Service* manual. If your memory expansion options are not set in this way, go to Chapter 6, "System Setup, Jumpers, and Switch Settings" to check whether EMA extended memory is installed.

CONTINUE ON THE NEXT PAGE

ARE THE OPTION JUMPERS AND SWITCH SETTINGS CORRECT?

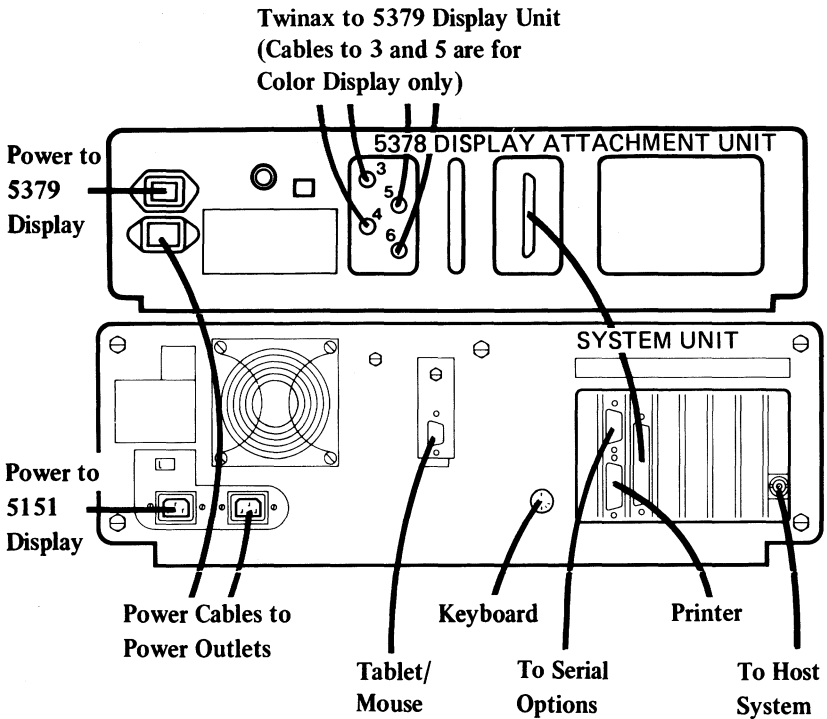
- NO** Go to Chapter 6, "System Setup, Jumpers, and Switch Settings" on page 6-1 and set the switch settings to match the configuration of the work station. If this does not correct the failure, continue to the next page.
- YES** Go to the next page.

1. Power off the work station in the correct sequence (system unit first).
2. Remove from the work station:
 - a. all non-IBM devices,
 - b. all modified options (prototype cards), and
 - c. all adapters that are not supported (see list on page 3-1).
3. Ensure that all external cable connectors are installed correctly and in their correct locations (see Chapter 4 for details).

CONTINUE ON THE NEXT PAGE

Work Station Cables (Full Configuration)

(Examples only, some work stations will not have all the cables installed.)



ARE ALL CONNECTORS INSTALLED CORRECTLY IN THEIR LOCATIONS?

NO Reconnect or repair the connectors. If this does not correct the failure, go to the next page.

YES Go to the next page.

What to expect while POST is running

Each time the work station is powered on, the power-on self-tests (POST) run. The **normal responses** are:

1. The keyboard status lights will flash (if installed).
2. After about 30 seconds, a memory size is displayed as a number near the top-left corner of the screen in **WHITE** on a black background with the cursor under the first digit. The number increases in 64K amounts until the correct memory size is reached.
3. One short beep sounds when POST completes.
4. The work station is loaded with one of the following:
 - an operating system (or advanced diagnostic program) from diskette
 - an operating system from any fixed disk
 - IBM PC BASIC (with a cursor under the O of "OK") from ROM.

The start screen for the program loaded is displayed.

Note: The options or messages on the screen may be displayed in the user's national language.

CONTINUE ON THE NEXT PAGE

The start screen with the advanced diagnostics diskette loaded should be as follows:

**The IBM 3270 Personal Computer AT/G or AT/GX
ADVANCED DIAGNOSTICS
Version X.XX
(C)Copyright IBM Corp.
1981, 1982, 1983, 1984, 1985**

SELECT AN OPTION

- 0 - SYSTEM CHECKOUT**
- 1 - FORMAT DISKETTE**
- 2 - COPY DISKETTE**
- 3 - PREPARE SYSTEM FOR MOVING**
- 4 - SETUP**
- 9 - END DIAGNOSTICS**

SELECT THE ACTION DESIRED

? _

A short beep sounds when the first menu is displayed. You should ignore this beep when you receive an error indication. Because of this, the beep is not included in the tables on pages 3-14 and 3-15.

CONTINUE ON THE NEXT PAGE

| An **error indication** could be similar to one of the following:

Note: **X** means any character could be displayed.

- A blank display (either nothing displayed or only a raster displayed)
- A wrong audio response
- An error message such as:

601

or **XXXXXX XXXX 201**

or **44XX (XXXX)**

or **1701**

or even a combination such as:

601

1701

If a combination of error codes appears, always troubleshoot the error code that appears first unless instructed to do differently. Make a note of all error codes that may be displayed and any audio responses that you hear.

CONTINUE ON THE NEXT PAGE

1. Power off the work station in the correct sequence (system unit first) see Chapter 1, page 1-17.
 2. Ensure that the power cable of the 5379 display is plugged into the 5378 DAU and NOT into the system unit.
 3. Ensure that the power cable of any 5151 additional display is plugged into the system unit.
 4. Plug into working, grounded power outlets the power cables for:
 - a. the system unit
 - b. the DAU
 - c. any other attached units.
 5. Turn the brightness control on the right side of the 5379 fully downward.
 6. Insert the advanced diagnostics diskette into drive A of the system unit and turn the load lever downward.
 7. Set the power switches to On in this sequence:
 - a. the 5378 DAU
 - b. all other attached devices
 - c. the system unit. **(This must be the last.)**
-

ARE ALL THE FANS RUNNING?

- System Unit
 - 5378 Display Attachment Unit
 - 5379 Display (Color only)
-

YES Go to page 3-12.

NO Go to the next page.

1. Ensure that all power switches are set to Off (system unit first). See Chapter 1, page 1-17.
2. If the work station is working correctly but a fan has failed in the system unit, install a new power supply unit.
3. Remove the failing unit's mainline power cable from the power outlet (or from the rear of the 5378 if fan is in the display unit).
4. Check the mainline power cable for continuity.
5. If the above procedure does not locate the failure, reconnect the mainline power cable and go to the PIC that corresponds to your symptom in the following table.

Symptom	PIC Title	Page
Fan failing in:	Go to:	
System unit	Undetermined problems	3-020-1
Display or DAU	5378 display attachment unit and 5379 display	3-4400-1

CONTINUE ON THE NEXT PAGE

If the 5378 DAU is not communicating with the system unit, its internal tests display a test pattern or series of test patterns on the 5379 display screen. See Chapter 2, page 2-6 for the test patterns.

IS THERE A TEST PATTERN ON THE 5379 DISPLAY SCREEN?

YES Go to PIC 3-4400-1.

NO Go to the next page.

If the display is too bright, adjust the brightness control.

**DID YOU RECEIVE THE THREE CORRECT POST
RESPONSES? (AS DESCRIBED ON PAGE 3-7)**

YES Go to page 3-16.

NO Go to the next page.

Go to the page in the following table that corresponds to the POST error symptom. If you have multiple error codes, go to the pages for the error codes in the order they are listed.

Notes:

1. *If the problem recurs, go to page 3-020-1.*
2. *In the following table, X represents any character.*

Error Indication	PIC Title	Page
No beep or Continual beeps or Continuous sound	Undetermined problems	3-020-1
Test pattern on 5379 screen	Display (5379) and attachment unit	3-4400-1
Any display problems: screen is blank, bad, or not readable, or screen is wrong color or has TV-type problems (such as rolling screen, or shadows), or there is a cursor problem (ignore beeps)	For main display: Display (5379) and attachment unit	3-4400-1
	For additional display: Display (5151) monochrome	3-400-1
Wrong memory size or no memory size displayed. (Not a blank screen.) See Note on next page.	Memory	3-200-1
1XX	System board	3-100-1
XXXXXX XXXX 201	Memory	3-200-1
PARITY CHECK XXXX	Memory	3-200-1

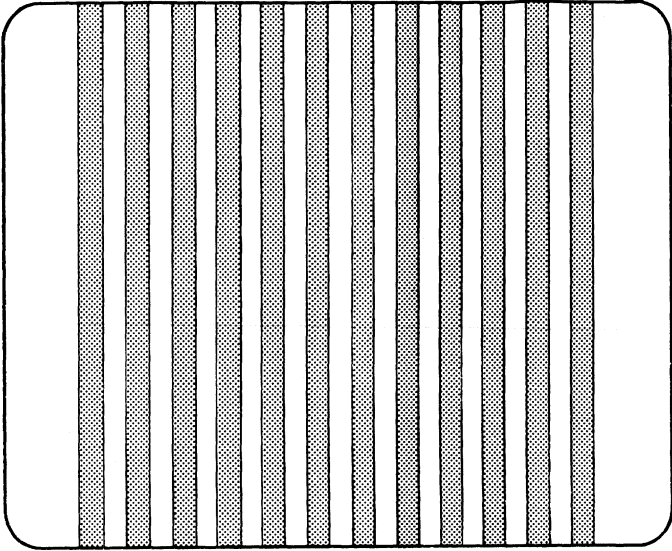
CONTINUE ON THE NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

Error Indication	PIC Title	Page
3XX	Keyboard check	3-300-1
4XX	Display (5151) monochrome	3-400-1
601	Diskette	3-600-1
9XX	Serial/Parallel adapter Parallel Port	3-900-1
10XX	Alternate Serial/Parallel adapter Parallel Port	3-1000-1
11XX	Serial/Parallel adapter Serial Port	3-1100-1
12XX	Alternate Serial/Parallel adapter Serial Port	3-1200-1
17XX	Fixed Disk Drive	3-1700-1
28XX	Distributed function commun- ications adapter	3-2800-1
36XX	General purpose interface bus adapter	3-3600-1
44XX (XXXX)	Display(5379) and attachment unit	3-4400-1
XXXXX ROM ERROR	ROM error table	3-29

Note: See the setup information in the *IBM 3270 Personal Computer AT/GX: Guide to Operations, SA33-3161*, or *IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit, SA33-3185*, to determine the amount of memory in your unit.

Press the test switch on the right-hand side of the 5379 display. There should be 12 to 16 white, stable, vertical bars displayed (see figure below).



ARE THE TEST BARS DISPLAYED CORRECTLY?

NO Go to page 3-4400-1.

YES Go to the next page.

Advanced Diagnostic Testing

Your advanced diagnostics should have loaded and the first menu should have displayed.

The IBM 3270 Personal Computer AT/G or AT/GX
ADVANCED DIAGNOSTICS
Version X.XX
(C)Copyright IBM Corp.
1981, 1982, 1983, 1984, 1985

SELECT AN OPTION

- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED

? _

DID THE ABOVE MENU APPEAR ON YOUR SCREEN?

- NO** If you received an error code, go to the error table on pages 3-14 and 3-15.
If you did not receive an error code, go to page 3-600-1.
- YES** Go to the next page.

1. Press 0 (SYSTEM CHECKOUT), then ←.

**IS A DISPLAY ATTACHED TO
EACH DISPLAY ADAPTER? (Y/N)**

? _

**DID THE ABOVE QUESTION APPEAR ON YOUR
DISPLAY?**

YES Press Y, then ←. Go to the next page.

NO Go to the next page.

A list of attached devices similar to the following appears on the 5379 screen.

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - XXXXXKB MEMORY
- 3 - KEYBOARD
- 4 - MONOCHROME DISPLAY & PRINTER ADAPTER
- 6 - X DISKETTE DRIVE(S) AND ADAPTER
- 9 - SERIAL/PARALLEL ADAPTER
 - PARALLEL PORT
- 11 - SERIAL/PARALLEL ADAPTER
 - SERIAL PORT
- 14 - GRAPHICS PRINTER
- 17 - X FIXED DISK DRIVE(S) AND ADAPTER
- 44 - GRAPHICS DISPLAY/ATTACHMENT UNIT AND DISPLAY/MOUSE/TABLET ADAPTER

IS THE LIST CORRECT (Y/N)

? _

IS THE INSTALLED DEVICES MENU DISPLAYED?

YES Go to page 3-23.

NO Go to the next page.

You may have a failing Math Coprocessor.

**DO YOU HAVE A MATH COPROCESSOR INSTALLED
IN YOUR SYSTEM UNIT?**

NO Go to page 3-22.

YES Go to the next page.

1. Set the system unit Power switch to Off
2. Remove the math coprocessor from the system board (see Chapter 5, page 5-1).
3. Set the system unit Power switch to On.
4. When Menu 3 – SELECT AN OPTION appears, press **0 (SYSTEM CHECKOUT)** then **←**.

Your screen should be similar to the one below.

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - XXXXXKB MEMORY
- 3 - KEYBOARD
- 4 - MONOCHROME DISPLAY & PRINTER ADAPTER
- 6 - X DISKETTE DRIVE(S) AND ADAPTER
- 9 - SERIAL/PARALLEL ADAPTER
 - PARALLEL PORT
- 11 - SERIAL/PARALLEL ADAPTER
 - SERIAL PORT
- 14 - GRAPHICS PRINTER
- 17 - X FIXED DISK DRIVE(S) AND ADAPTER
- 44 - GRAPHICS DISPLAY/ATTACHMENT UNIT AND DISPLAY/MOUSE/TABLET ADAPTER

IS THE LIST CORRECT (Y/N)

? _

**IS YOUR SCREEN SIMILAR TO THE ONE ABOVE?
(Y/N)**

NO Go to the next page.

YES Install a new math coprocessor. If this does not correct the problem, install a new system board (see Chapter 5, page 5-1).

Press any keyboard numeric key, except 0. If the key is working correctly its number appears on the screen.

ARE ANY OF THE NUMERIC KEYS AT THE TOP OF THE KEYBOARD WORKING CORRECTLY?

- YES** Install a new keyboard. See Chapter 5, page 5-1.
- NO** Install a new system board. See Chapter 5, page 5-1.

| Read the notes before continuing. If a 5170 system unit is
| installed go to Note 4. If a 5373 system unit is installed
| go to Note 1

| *Notes:*

- | 1. *You must check if you have Even-Megabyte-Aligned (EMA) extended memory installed before starting problem determination on memory failures. See Chapter 6, "System Setup, Jumpers, and Switch Settings" on page 6-1 to verify if EMA extended memory is installed.*
- | 2. *If you have EMA extended memory installed, it is not included in the memory size shown on the screen during POST and does not appear on the displayed list.*
- | 3. *EMA extended memory may be tested by running test 44, option 8.*
- | 4. *Not all devices and options are recognized by the advanced diagnostic control program. If you are not sure if a device or option is supported, or a device or option is missing, press N, then ←.*

| *If you answer No, perform the instructions on the screen to add or delete items, before returning to here and typing Y.*

| *If you are sure, press Y, then ←, and go to the next page.*

1. Ensure that the switch settings are correct. (See Chapter 6, "System Setup, Jumpers, and Switch Settings" on page 6-1.)
 2. The system checkout menu is displayed.
-

SYSTEM CHECKOUT

- 0 - RUN TESTS ONE TIME**
- 1 - RUN TESTS MULTIPLE TIMES**
- 2 - LOG UTILITIES**
- 9 - END SYSTEM CHECKOUT**

SELECT THE ACTION DESIRED

? -

DO YOU NEED AN EXPLANATION OF THIS MENU?

NO Select the type of test you want to perform and go to page 3-26.

YES Go to the next page.

0 – RUN TESTS ONE TIME – Test 0 checks whether the installed devices are working correctly.

1 – RUN TEST MULTIPLE TIMES – Repeats the installed devices test as many times as you want.

2 – UTILITIES – You have the option of selecting one of the following from a utilities program.

START ERROR LOG

STOP ERROR LOG

LIST LOG

SET TIME OF DAY

DISPLAY TIME OF DAY

RETURN FROM UTILITIES

START AND STOP ERROR LOG – Enables you to record, in a log, the errors that the advanced diagnostics find. They can be written to diskette or printer.

LIST LOG – Displays the error log, contained on the advanced diagnostics diskette.

SET TIME OF DAY – When you select this function and set the time of day, the machine keeps track of the time and displays it when requested.

DISPLAY TIME OF DAY – Displays the time of day when requested. If the system unit has been switched Off since the Set-Time-of-Day was used, the clock restarts at 0 when power is switched On.

The contents of the clock are continuously updated. The value is set to 0 by POST, thus the clock always contains the time since POST was run. The contents can be reset by using the Set-Time-of-Day function.

RETURN FROM UTILITIES – Permits you to leave the utilities program and return to the main menu.

9 – EXIT DIAGNOSTIC ROUTINES - Permits you to return to the first advanced diagnostics menu.

You are now ready to select the type of test you want to run.

1. When you are ready to run the tests, press 0 or 1 and then ←. The menu shown below appears on your screen.
2. Perform the instructions on the screen to select the device you want to test.

1 - SYSTEM BOARD
2 - XXXXXKB MEMORY
3 - KEYBOARD
4 - MONOCHROME DISPLAY & PRINTER ADAPTER
6 - X DISKETTE DRIVE(S) AND ADAPTER
9 - SERIAL/PARALLEL ADAPTER
 - PARALLEL PORT
11 - SERIAL/PARALLEL ADAPTER
 - SERIAL PORT
14 - GRAPHICS PRINTER
17 - X FIXED DISK DRIVE(S) AND ADAPTER
44 - GRAPHICS DISPLAY/ATTACHMENT UNIT AND
 DISPLAY/MOUSE/TABLET ADAPTER

SELECT OPTION NUMBER(S) TO TEST OR
PRESS "ENTER" TO SELECT ALL OPTIONS
? _

DO YOU WANT TO TEST A SINGLE OPTION?

YES Go to the PIC that corresponds to the device you have selected to test (see the Contents list on page 3-1).

NO Go to next page.

If you want to test all options, go to the PICs one at a time for the options displayed on your screen. Start with the system board PIC on page 3-100-1.

Note: You may, instead, press **←** and test all installed devices by performing the instructions on the screen. If a failure occurs, review the correct PIC.

Select the PIC that corresponds to your error code from the table on the next page.

Notes:

- 1. If the last two digits of a code are zeros, the device has tested successfully. (This note does not apply to ROM errors.)*
- 2. For codes on the hexadecimal indicator in the system unit, see page 2-5.*
- 3. Remember that XXXX may be any characters.*

Error Code	PIC	Page
	Undetermined problem	3-020-1
1XX	System board	3-100-1
20X or XXXXXX XXXX 20X or parity check	Memory	3-200-1
3XX	Keyboard	3-300-1
4XX	Additional 5151 display (mono)	3-400-1
6XX	Diskette drive	3-600-1
7XX	Math coprocessor	3-700-1
9XX	Serial/Parallel adapter - parallel port	3-900-1
10XX	Alternate Serial/Parallel adapter - parallel port	3-1000-1
11XX	Serial/Parallel adapter - serial port	3-1100-1
12XX	Alternate Serial/Parallel adapter - serial port	3-1200-1
14XX	Printer	3-1400-1
17XX	Fixed disk drive	3-1700-1
28XX	Distributed function communications	3-2800-1
29XX	Color graphics printer	3-2900-1
36XX	General purpose interface bus adapter	3-3600-1
44XX	5378 DAU and 5379 display	3-4400-1
XXXXX ROM ERROR	ROM table	3-29

Go to the correct PIC.

ROM Error Table

Error Code	Corrective Action
C0000 CA000	Install a new display/mouse/tablet adapter card
C8000	Install a new fixed disk adapter card
F0000 F1000 F2000 F3000 F4000 F5000 F6000 F7000 F8000 F9000 FA000 FB000 FC000	Install a new system board in the system unit



Intermittent Problems

You have entered this PIC because you have completed the advanced diagnostics tests without finding an error or you suspect an intermittent problem. The following steps will aid you to diagnose a failure in your system and record the error message in the error log.

Creating the Error Log

1. Insert the advanced diagnostics diskette into drive A.
2. Press **O (SYSTEM CHECKOUT)** then **←**.
3. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **←**.
4. Press **Y** or **N (IS LIST CORRECT (Y/N)?)** then, **←**.
5. Press **2 (LOG UTILITIES)** then **←**.
6. Press **0 (START ERROR LOG)** then **←**.
7. Press **0 (LOG TO DISKETTE, OR PRINTER (O/I)?)** then **←**.

Note: The following appears only if you log to diskette.

8. Press **A** or **B (ENTER THE DRIVE ID FOR ERROR LOG?)** then **←**.

Note: You cannot log errors to a diskette drive that is being tested. If you plan to test a diskette drive, you must log the errors to a diskette drive that is not being tested, or to a printer. When recording errors on a diskette, use a copy of the advanced diagnostics diskette that is not write-protected.

9. Press **9 (END LOG UTILITIES)** then **←**.

CONTINUE ON THE NEXT PAGE

Starting the Test

1. Press 1 (RUN TESTS MULTIPLE TIMES) then ←.
2. Select the device you suspect has failed then press ←.
3. Press N (WAIT EACH TIME AN ERROR OCCURS (Y/N)?) then ←.
4. Perform any instructions on your screen and select all available tests.

CONTINUE ON THE NEXT PAGE

End the Test and Display the Error Log

1. Press and hold the **Ctrl** key then press the **Break** key.
2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **↵**.
3. Press **Y** or **N (IS THE LIST CORRECT (Y/N)?)** then **↵**.
4. Press **2 (LOG UTILITIES)** then **↵**.
5. Press **2 (DISPLAY LOG)** then **↵**.
6. Press **A** or **B (ENTER THE DRIVE ID FOR ERROR LOG?)** then **↵**.
7. If no errors occurred, the Log Utilities menu appears. If errors are displayed, go to "Start" on page 3-2 and find your error code, then go to the appropriate PIC.



Undetermined Problems

You have entered this PIC because you were unable to complete POST, you have an intermittent problem, a PIC did not find your problem, or you suspect a power problem. It is assumed that you have a good mainline power supply outlet and mainline power cable.

DANGER

Switch off all power before removing or installing each device.

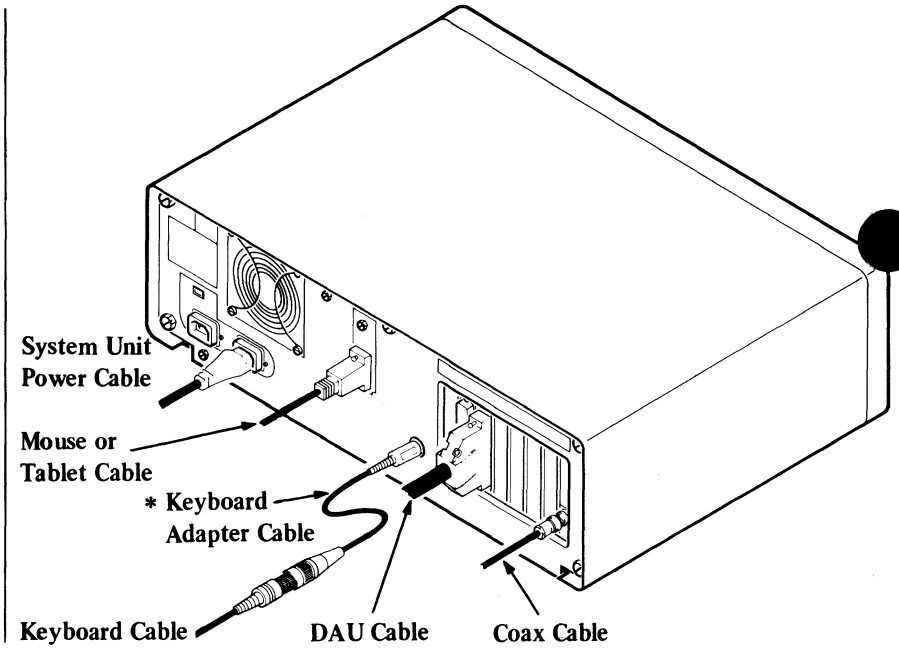
1. Power off the work station in the correct sequence. See Chapter 1, page 1-17.

2. Unplug the system unit's mainline power cable from the power outlet.
3. Remove the keyboard cable (or the keyboard adapter cable, if installed) from the system unit.

CAUTION

Do not disconnect or reconnect a coaxial cable or IBM Cabling System during an electrical storm.

4. Disconnect the system-unit-to-DAU cable from the system unit. Remove any external devices attached to option adapters in the system unit.
5. Plug the mainline power cable into the power outlet.



*IBM 3270 PC Keyboard Adapter Cable (IBM Part 1887915). Applicable only to IBM 3270 Personal Computer Keyboards.

6. Power on the work station in the correct sequence. See Chapter 1, page 1-18. (Ignore any X301 or X302 error codes you may receive.)
-

DID THE FAILURE SYMPTOM REMAIN?

YES Go to page 3-020-8.

NO Go to the next page.

1. Power off the system unit then the DAU.
2. Reconnect the system-unit-to-DAU cable.
3. Power on the DAU, then the system unit.

(Ignore any X301 or X302 error codes you may receive.)

DID THE FAILURE SYMPTOM RECUR?

YES Go to page 3-020-6.

NO Go to the next page.

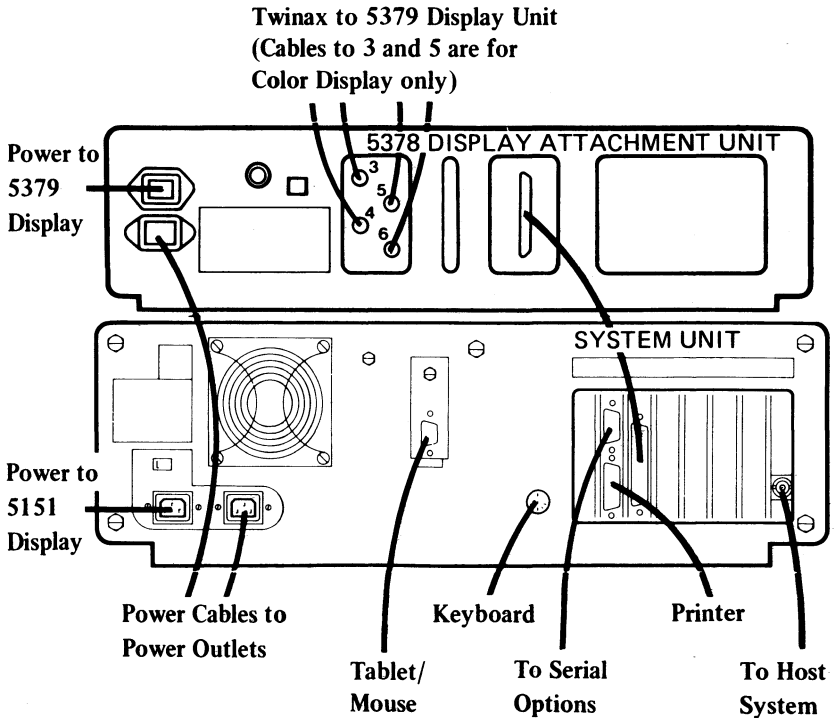
DANGER

Switch off all power before removing or installing each device.

Reconnect the keyboard cable (or the keyboard adapter cable, if installed) and external devices to the system unit, one at a time, until the failure symptom recurs: then install a new device in place of the one that caused the failure.

Work Station Cables (Full Configuration)

(Example only; some work stations do not have all the cables installed.)



1. Power off the system unit, then the DAU.
 2. Disconnect the system-unit-to-DAU cable at the DAU end.
 3. Power on the system unit.
-

DID THE FAILURE SYMPTOM RECUR?

YES Install a new system-unit-to-DAU cable. See Chapter 5, page 5-1.

NO Go to the next page.

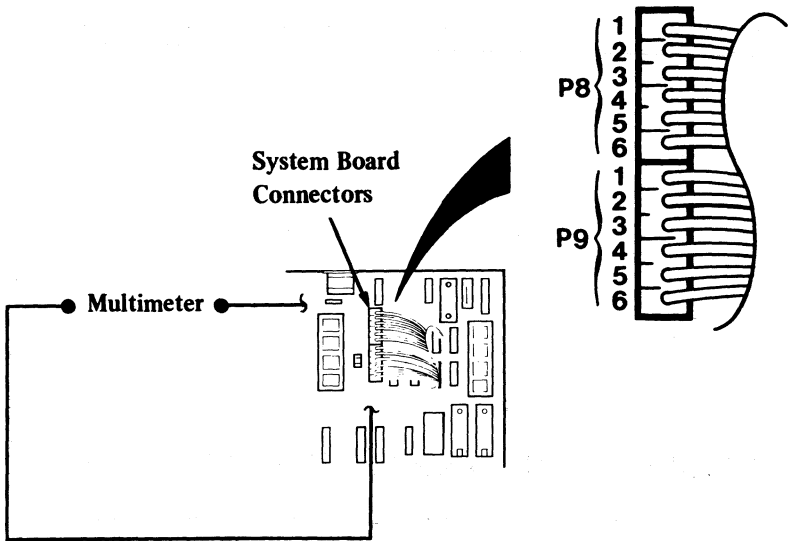
1. Power off the system unit, then the DAU.
 2. Reconnect the system-unit-to-DAU cable at the DAU end.
 3. Remove the DAU cover.
 4. Unseat the GP, UC, SC, and BP0/1 (color only), BP2/3, BP4/5 cards in the DAU (see the locations label on the card cage). (Leave the DBR and CVD cards seated.)
 5. Power on the DAU, then the system unit.
 6. Wait 1 minute.
-

DID THE FAILURE SYMPTOM RECUR?

NO Power off. Reseat each card, one at a time, until the failure symptom returns, then install a new card in place of the one that failed.

YES Power off the system unit, then the DAU. Reseat all DAU cards. Check the seating of connectors and the logic board/interconnect card assembly. If no cause of failure was identified, install a new CVD card, then, as necessary, a new DBR card, and a new bus receiver flexi-cable in the DAU. See Chapter 5, page 5-1.

1. Set the power switch of the system unit to Off.
 2. Remove the system unit cover. See Chapter 5, page 5-1.
 3. Set your meter to the 12-V dc scale. Connect the common lead to pin 5 and the voltage lead to pin 1 on the system board's power connector P8.
 4. Set the power switch of the system unit to On.
 5. Check for a voltage of 2.4 to 5.2-V dc.
-



DO YOU HAVE 2.4 TO 5.2-V DC BETWEEN PIN 1 AND PIN 5?

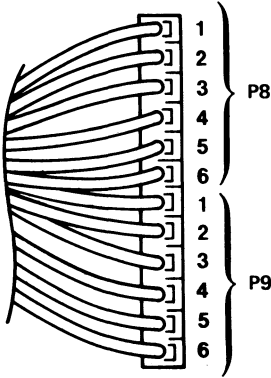
NO Go to page 3-020-16.

YES Go to the next page.

Check all other power supply voltages at the system board:

1. Set your meter to the 12-V dc scale.
2. Review the figure below and check the system board power connectors for the correct voltage.

Voltage Connectors			
Min V dc	Max V dc	- Lead	+ Lead
+ 4.8	+ 5.2	J8 - 5	J9 - 4
+ 4.5	+ 5.4	J9 - 3	J8 - 6
+ 11.5	+ 12.6	J9 - 1	J8 - 3
+ 10.8	+ 12.9	J8 - 4	J9 - 2



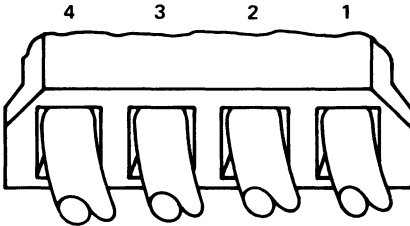
ARE THE SYSTEM-BOARD POWER-CONNECTOR VOLTAGES CORRECT?

NO Install a new power supply unit. See Chapter 5, page 5-1.

YES Go to the next page.

1. Set the power switch of the system unit to Off.
2. Ensure that the power connector of the top diskette drive is connected.
3. Set the power switch of the system unit to On.
4. Review the figure below and check the power connector of the top diskette drive for the correct voltages.

Power Connector			
Min V dc	Max V dc	- Lead	+ Lead
+ 4.8	+ 5.2	2	4
+ 11.5	+ 12.6	3	1



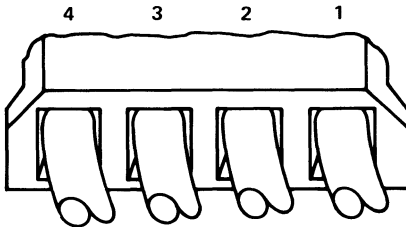
ARE THE VOLTAGES CORRECT?

- NO** Install a new power supply unit. See Chapter 5, page 5-1.
- YES** Go to the next page.

If your system unit has only one diskette drive, continue on the next page.

1. Set the power switch of the system unit to Off.
2. Ensure that the power connector of the bottom diskette drive is connected.
3. Set the power switch of the system unit to On.
4. Review the figure below and check the power connector of the bottom diskette drive for the correct voltages.

Power Connector			
Min V dc	Max V dc	- Lead	+ Lead
+ 4.8	+ 5.2	2	4
+ 11.5	+ 12.6	3	1



ARE THE VOLTAGES CORRECT?

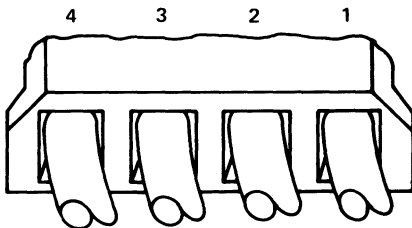
NO Install a new power supply unit. See Chapter 5, page 5-1.

YES Go to the next page.

If your system has no fixed disk drives, continue on page 3-020-14.

1. Set the power switch of the system unit to Off.
2. Ensure that the power connector of the left fixed disk drive is connected.
3. Set the power switch of the system unit to On.
4. Review the figure below and check the power connector of the left fixed disk drive for the correct voltages.

Power Connector			
Min V dc	Max V dc	- Lead	+ Lead
+ 4.8	+ 5.2	2	4
+ 11.5	+ 12.6	3	1



ARE THE VOLTAGES CORRECT?

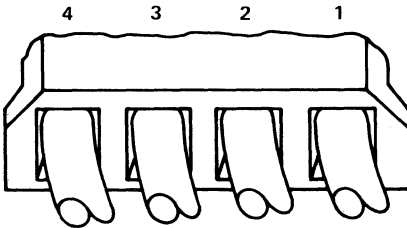
NO Install a new power supply unit. See Chapter 5, page 5-1.

YES Go to the next page.

If your system unit has only one fixed disk drive, continue on the next page.

1. Set the power switch of the system unit to Off.
2. Ensure that the power connector of the right fixed disk drive is connected.
3. Set the power switch of the system unit to On.
4. Review the figure below and check the power connector of the right fixed disk drive for the correct voltages.

Power Connector			
Min V dc	Max V dc	- Lead	+ Lead
+ 4.8	+ 5.2	2	4
+ 11.5	+ 12.6	3	1



ARE THE VOLTAGES CORRECT?

NO Install a new power supply unit. See Chapter 5, page 5-1.

YES Go to the next page.

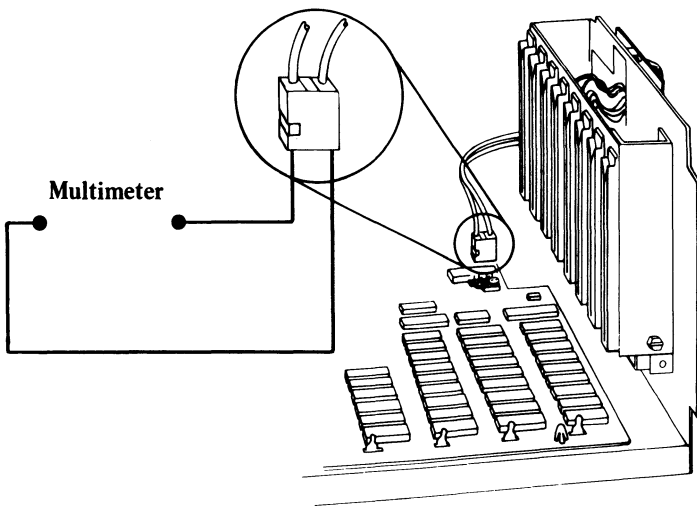
DO YOU GET A BEEP AT ANY TIME?

NO Go to the next page.

YES Go to page 3-020-17.

Check the speaker circuit:

1. Set the power switch of the system unit to Off.
2. Set your meter to the Ohms X 1 scale.
3. Disconnect the speaker cable from the system board. See Chapter 5, page 5-1.
4. Review the figure below and check the continuity of the speaker.

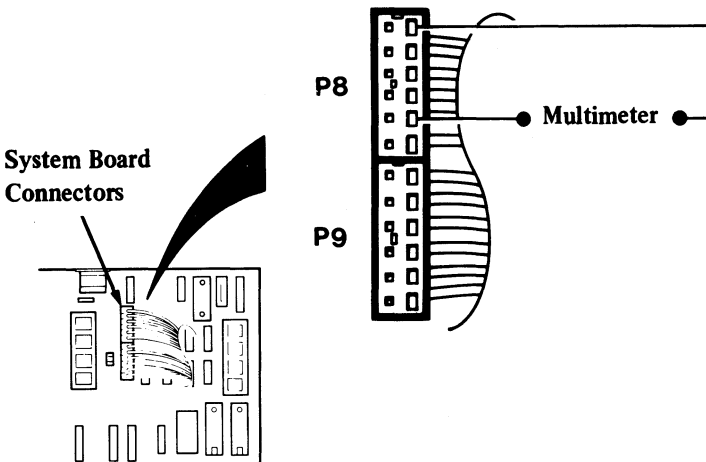


DOES THE SPEAKER HAVE CONTINUITY?

NO Install a new speaker. See Chapter 5, page 5-1.

YES Reconnect the speaker then go to page 3-020-17.

1. Set the power switch of the system unit to Off.
 2. Disconnect the system board power connectors P8 and P9.
 3. Set your meter to the 12-V dc scale. Connect the common lead to pin 5 and the voltage lead to pin 1 on connector P8.
 4. Set the power switch of the system unit to On.
 5. Check for a voltage of 2.4 to 5.2-V dc.
-



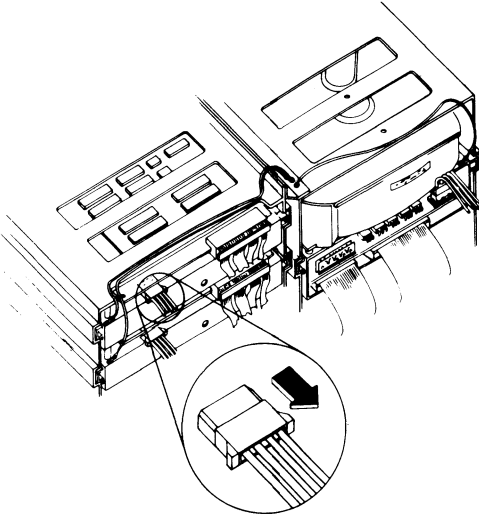
DO YOU HAVE 2.4 TO 5.2-V DC BETWEEN PIN 1 AND PIN 5?

NO Install a new power supply unit. See Chapter 5, page 5-1.

Note: If no fixed disk drives are installed in your system unit, a power supply load resistor is required for normal operation of the power supply. It may be attached to either connector P10 or P11.

YES Go to the next page.

1. Set the power switch of the system unit to Off.
 2. Ensure that the system board power connectors P8 and P9 are connected.
 3. Disconnect the power cable from the top diskette drive.
 4. Set the power switch of the system unit to On.
-



DID THE FAILURE SYMPTOM REMAIN?

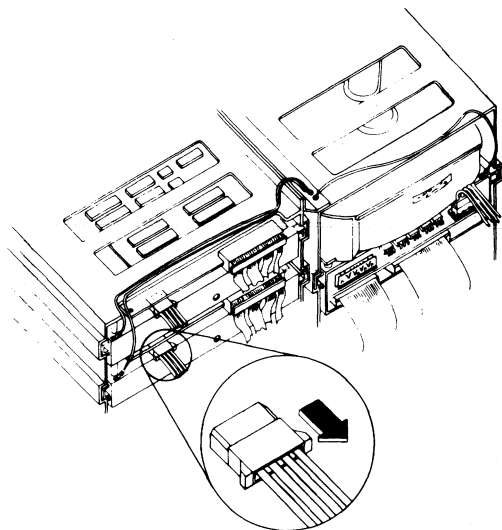
NO Install a new top diskette drive. See Chapter 5, page 5-1.

YES

1. Set the power switch of the system unit to Off.
2. Reconnect the power cable to the top diskette drive.
3. Go to the next page.

If your system unit has only one diskette drive, continue on the next page.

1. Disconnect the power cable from the bottom diskette drive.
 2. Set the power switch of the system unit to On.
-



DID THE FAILURE SYMPTOM REMAIN?

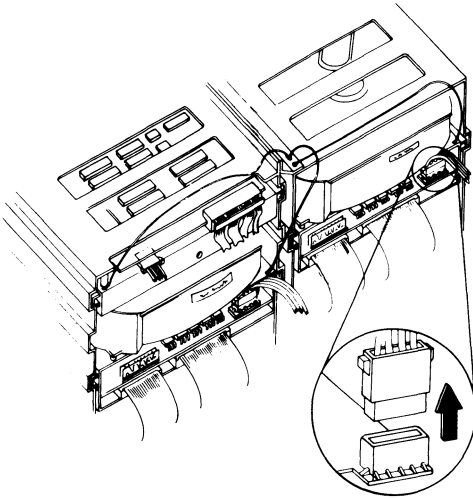
NO Install a new bottom diskette drive. See Chapter 5, page 5-1.

YES

1. Set the power switch of the system unit to Off.
2. Reconnect the power cable to the bottom diskette drive.
3. Go to the next page.

If your system has no fixed disk drive, go to page 3-020-21.

1. Disconnect the power cable from the left fixed disk drive.
 2. Set the power switch of the system unit to On.
-



DID THE FAILURE SYMPTOM REMAIN?

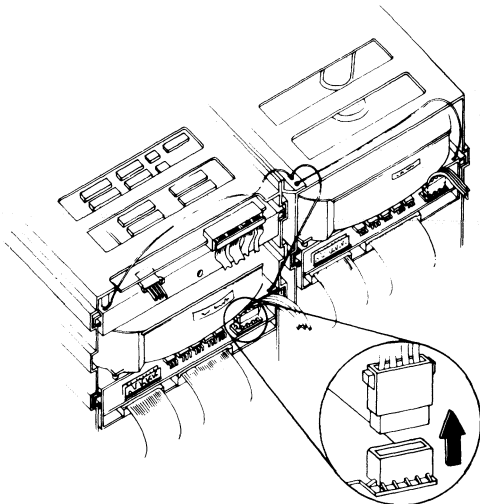
NO Install a new left fixed disk drive. See Chapter 5, page 5-1.

YES

1. Set the power switch of the system unit to Off.
2. Reconnect the power cable to the left fixed disk drive.
3. Go to the next page.

If your system unit has only one fixed disk drive, continue on the next page.

1. Disconnect the power cable from the right fixed disk drive.
 2. Set the power switch of the system unit to On.
-



DID THE FAILURE SYMPTOM REMAIN?

NO Install a new right fixed disk drive. See Chapter 5, page 5-1.

YES

1. Set the power switch of the system unit to Off.
2. Reconnect the power cable to the right fixed disk drive.
3. Go to the next page.

You may have a failing adapter. Perform the following procedures.

1. Set the power switch of the system unit to Off.
2. Remove one adapter at a time in the following sequence from the system board:
 - Options adapters
 - Any options not listed below
 - Serial/Parallel adapter.
 - Distributed function communications adapter
 - Math coprocessor (if installed), see Chapter 4, Figure 4-17 on page 4-18
 - Fixed disk and diskette adapter (601 Error)
 - 5151 Monochrome display adapter
 - Display/mouse/tablet adapter – (3 beeps: 1 long, 2 short, followed by 2 beeps).
3. Set the power switch of the system unit to On.

Note: Error codes shown above result from removing the adapter card.
4. Repeat steps 1, 2, and 3, removing all adapters, one at a time, until either the original symptom disappears or you have tried all adapters.

CONTINUE ON THE NEXT PAGE

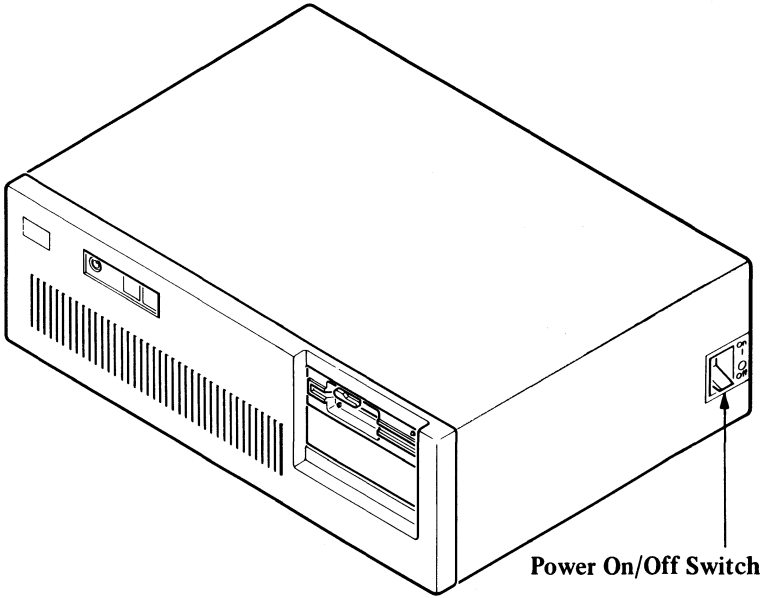
DID THE FAILURE SYMPTOM REMAIN?

- NO** Install a new adapter in place of the one that failed. See Chapter 5, page 5-1.
If this does not solve the problem, install a new system board.
- YES** Install a new system board. See Chapter 5, page 5-1.

System Board

You have entered this PIC because you were unable to complete POST, or you received a 1XX error message.

1. Power off the work station in the correct sequence, see Chapter 1, page 1-17.
2. Wait 5 seconds.
3. Power on the work station in the correct sequence, see Chapter 1, page 1-18.



DID YOU RECEIVE A 1XX ERROR MESSAGE DURING THIS POST?

- YES** Go to page 3-100-5.
- NO** Go to the next page.

1. Power off the work station in the correct sequence.
See Chapter 1, page 1-17.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Power on the work station in the correct sequence.
See Chapter 1, page 1-18.
 4. Your screen should match the one below.
-

**The IBM 3270 Personal Computer AT/G or AT/GX
ADVANCED DIAGNOSTICS
Version X.XX
(C)Copyright IBM Corp.
1981, 1982, 1983, 1984, 1985**

SELECT AN OPTION

- 0 - SYTEM CHECKOUT**
- 1 - FORMAT DISKETTE**
- 2 - COPY DISKETTE**
- 3 - PREPARE SYSTEM FOR MOVING**
- 4 - SETUP**
- 9 - END DIAGNOSTICS**

SELECT THE ACTION DESIRED

? _

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

YES Go to the next page.

1. Press **0 (SYSTEM CHECKOUT)** then **←**.
2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **←**.
3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **←**. If the list is wrong, perform the follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer **Yes** before you can continue.
4. Press **1 (RUN TEST MULTIPLE TIMES)** then **←**.
5. Press **1 (SYSTEM BOARD)** then **←**.
6. Select the number of times to run the test, then press **←**; or press **←** to run tests continuously.
7. Press **Y (WAIT EACH TIME AN ERROR OCCURS (Y/N)?)** then **←**.
8. Press **Y (DO YOU WANT TO TEST YOUR SYSTEM CLOCK (Y/N)?)** then **←**.

CONTINUE ON THE NEXT PAGE

The screen below shows the system-board test result. A 100 message indicates a successful test.

TESTING – SYSTEM BOARD

100 SYSTEM BOARD

DID YOU RECEIVE A 1XX ERROR MESSAGE?

YES Install a new system board see Chapter 5, page 5-1.

Note: A 199 error message means you answered **No** in the installed-devices menu. Do not install new system board. Instead go to “Start” on page 3-2 and verify the installed devices.

NO You have successfully completed the system board advanced diagnostic tests. If you suspect an intermittent problem; go to page 3-010-1.

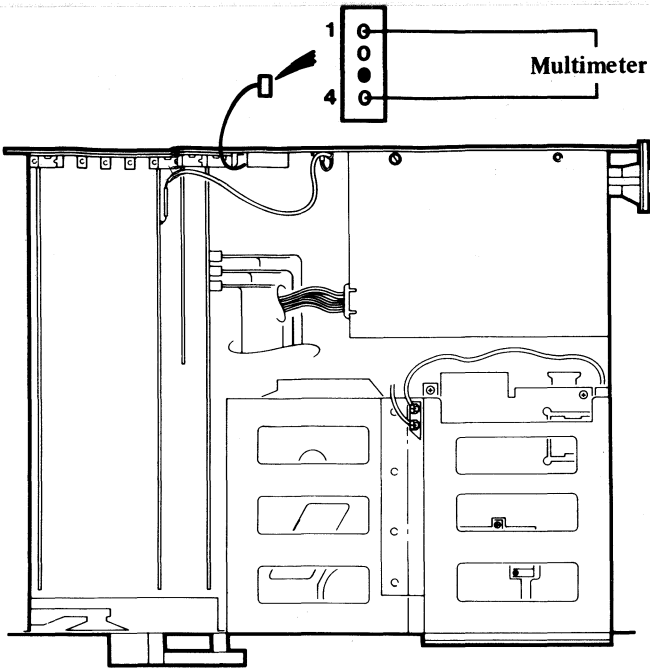
In the figure below, find the error code you received during the POST and go to the page specified.

Error Code	Indication or Repair Action	Go to Page
101	Interrupt Failure	3-020-21
102	Install a new System Board	5-1
103	Install a new System Board	5-1
104	Install a new System Board	5-1
105	System Unit Failure	3-100-8
106	Install a new System Board	5-1
107	Install a new System Board	5-1
108	Install a new System Board	5-1
109	Install a new System Board	5-1
121	Install a new System Board	5-1
151	Battery Defective or New Battery Installed	3-100-6
152	Install a new System Board	5-1
161	Battery Defective or New Battery Installed	3-100-6
162	System Options Error -(Run Setup)	6-1
163	Date and Time Not Set	6-1
164	Memory Size Error	6-1
199	Option Setup Error	3-2

Note: A “161 Battery Defective” or “New Battery Installed” message appears during the first POST after a battery installation or new battery replacement. If you just installed a new battery, go to Section 6, in the IBM Personal Computer AT *Hardware Maintenance and Service*, and do the “Setup” program.

1. Set the power switch of the system unit to Off.
2. Remove the system unit cover (see Chapter 5, page 5-1).
3. Disconnect the battery connector.
4. Set your meter to the 12-V dc scale. Connect the common lead to pin 1 and the voltage lead to pin 4 on the battery connector. Check for a voltage of 6.0-V dc minimum.

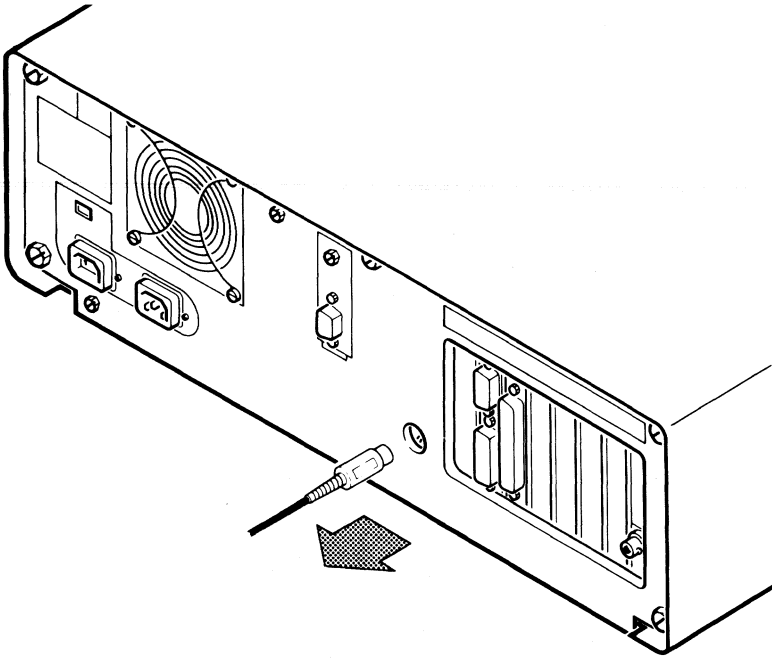
CONTINUE ON THE NEXT PAGE



IS THE VOLTAGE AT LEAST 6.0 V DC?

- NO** Install a new battery (see Chapter 5, page 5-1). Then go to Section 6, in the *IBM Personal Computer AT Hardware Maintenance and Service*, and do the "Setup" program.
- YES** Install a new system board (see Chapter 5, page 5-1).

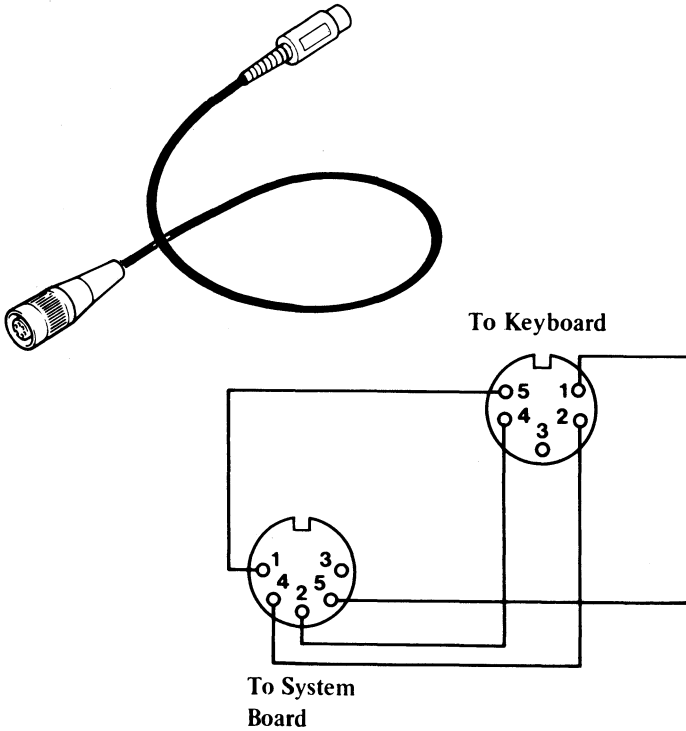
1. Power off the work station in the correct sequence, see Chapter 1, page 1-17.
2. Disconnect the keyboard cable (or keyboard adapter cable if installed) from the system unit.
3. Power on the work station in the correct sequence, see Chapter 1, page 1-18.



DID YOU RECEIVE A 105 SYSTEM BOARD ERROR?

- YES** Install a new system board (see Chapter 5, page 5-1).
- NO** If you have a keyboard adapter cable go to the next page. If you **do not** have a keyboard adapter cable, install a new keyboard (see Chapter 5, page 5-1).

1. Disconnect the keyboard adapter cable from the keyboard cable.
2. Review the figure below and check the keyboard adapter cable for continuity.



IS THE KEYBOARD ADAPTER CABLE GOOD?

- NO** Install a new keyboard adapter cable (see Chapter 5, page 5-1).
- YES** Install a new keyboard (see Chapter 5, page 5-1).



Memory

You have entered this PIC because you were unable to complete POST, the memory size message was not correct, there was a memory parity check, you have an error message indicating a memory failure, or you want to test the memory using the Advanced Diagnostics diskette.

Read *all* of this page before continuing.

Use the Memory PIC on page 3-200-1 of IBM Personal Computer AT *Hardware Maintenance and Service*, to solve the memory problems.

Notes:

1. *When instructed in the Memory PIC to:*
 - *Power off the system unit, you should power off the work station in the correct sequence (see Chapter 1, page 1-17).*
 - *Power on the system unit, you should power on the work station in the correct sequence (see Chapter 1, page 1-18).*
 - *Use the Advanced Diagnostics diskette, you should use the Advanced Diagnostics diskette **that is shipped with this book.***
2. *Return to this book, if necessary, after you have solved the memory problems.*
3. ***For IBM 5373 system units only.** You must check whether you have Even-Megabyte-Aligned (EMA) extended memory installed before starting problem determination on memory failures. See Chapter 6, "System Setup, Jumpers, and Switch Settings" on page 6-1, to verify if EMA extended memory is installed.*

CONTINUE ON THE NEXT PAGE

- | 4. *If you have EMA extended memory installed, it is not included in the memory size shown on the screen during POST.*
- | 5. *EMA extended memory may be tested by running test 44, option 8.*

Keyboard

You have entered this PIC because you were unable to complete POST, you have detected a keyboard problem, or you have error messages indicating a keyboard or adapter problem.

1. Power off the work station in the correct sequence. See Chapter 1, page 1-17. (System unit first.)
2. Insert the advanced diagnostics diskette into drive A.
3. Power on the work station in the correct sequence. See Chapter 1, page 1-18. (System unit last.)

XXXXXX KB OK

302 - System Unit Keylock is Locked
- Unlock System Unit Keylock
(RESUME = "F1" KEY)

DID YOU RECEIVE A 302 ERROR CODE DURING POST?

YES Unlock the system unit key lock. Press the F1 key to resume POST. If the system unit key lock is unlocked go to page 3-300-20.

NO Go to the next page.

**DOES A "CA000 ROM ERROR" MESSAGE APPEAR
WHILE POST IS RUNNING?**

YES Install a new display/mouse/tablet adapter card.

NO Go to the next page.

IS ANY 3XX POST ERROR CODE DISPLAYED?

NO Go to the next page.

YES Go to the "3XX Error Code Table" on
page 3-300-21.

**ARE THERE CONTINUOUS BEEPS WHEN POST
COMPLETES?**

YES Check the keyboard for binding keys. Install a new keyboard if necessary.

NO Go to the next page.

Your screen should match the one below.

The IBM 3270 Personal Computer AT/G or AT/GX
ADVANCED DIAGNOSTICS
Version X.XX
(C)Copyright IBM Corp.
1981, 1982, 1983, 1984, 1985

SELECT AN OPTION

- 0 - SYTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED

? _

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

YES

1. Press **0 (SYSTEM CHECKOUT)** then **←**.
2. Depending on the options installed in your system, questions about the attached devices may appear on your screen. Press **Y** or **N** as required, then **←**.
3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **←**. If the list is not correct, perform the instruction on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
4. Press **0 (RUN TESTS ONE TIME)** then **←**.
5. Press **3 (KEYBOARD)** then **←**.

Your screen should match the one below.

**TESTING -
KEYBOARD**

**DO YOU WANT TO TEST YOUR
SYSTEM UNIT KEYLOCK (Y/N)?**

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to the next page.

YES Go to page 3-300-8.

IS ANY 3XX POST ERROR CODE DISPLAYED?

NO Install a new keyboard.

YES Go to the "3XX Error Code Table" on
page 3-300-21.

Use the system unit key lock test to check the operation of your key lock. You have fifteen seconds after pressing Y and then ← to lock and then unlock your system unit key lock during the test.

**TESTING -
KEYBOARD**

**DO YOU WANT TO TEST YOUR SYSTEM UNIT
SYSTEM UNIT KEYLOCK (Y/N)?**

Y

LOCK THE SYSTEM UNIT KEYLOCK

UNLOCK THE SYSTEM UNIT KEYLOCK

**DO YOU WANT TO TEST YOUR SYSTEM UNIT KEY
LOCK?**

YES Press Y and then press ←.
Lock and unlock your system unit key lock. Go to
the next page.

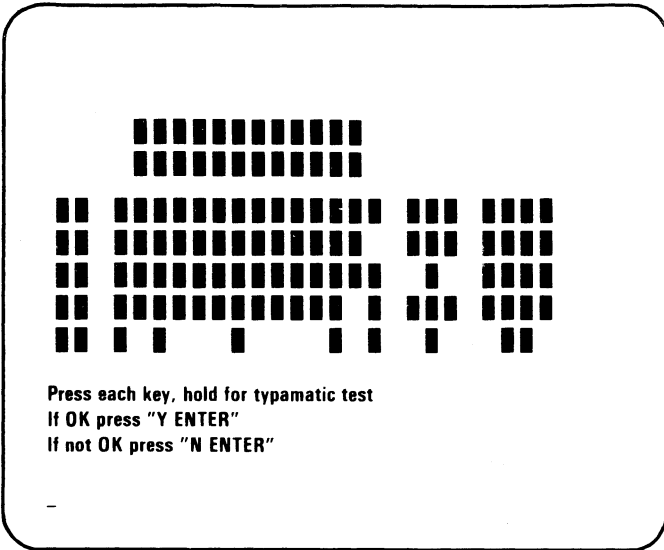
NO Press N and then press ←. Go to page 3-300-10.

IS A 317 ERROR CODE DISPLAYED?

YES Go to page 3-300-20.

NO Go to the next page.

The screen should match the attached keyboard.



DOES THIS SCREEN DISPLAY APPEAR?

NO Go to page 3-300-13.

YES Go to the next page.

Press each keyboard key.

Press each key, hold for typamatic test
If OK press "Y ENTER"
If not OK press "N ENTER"

DOES EACH BLOCK CHANGE TO * WHEN THE CORRESPONDING KEYBOARD KEY IS PRESSED?

NO Install a new keyboard, see Chapter 5, page 5-1.

YES Go to the next page.

When any key is held down, the character in the corresponding position on the screen blinks.

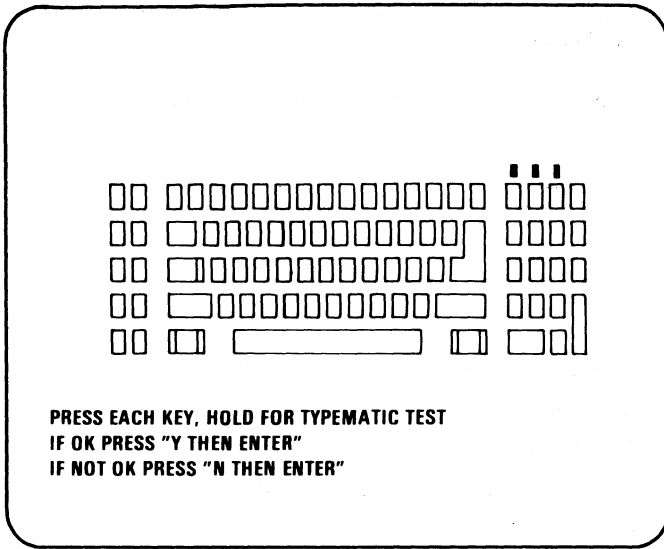
DOES HOLDING DOWN A KEY CAUSE THE * IN THE CORRESPONDING POSITION ON THE SCREEN TO BLINK?

YES Go to page 3-300-17.

NO Go to page 3-300-16.


IMPORTANT: Do not perform any of the commands on the screen. Perform the instructions in this manual.

Did the following screen appear?



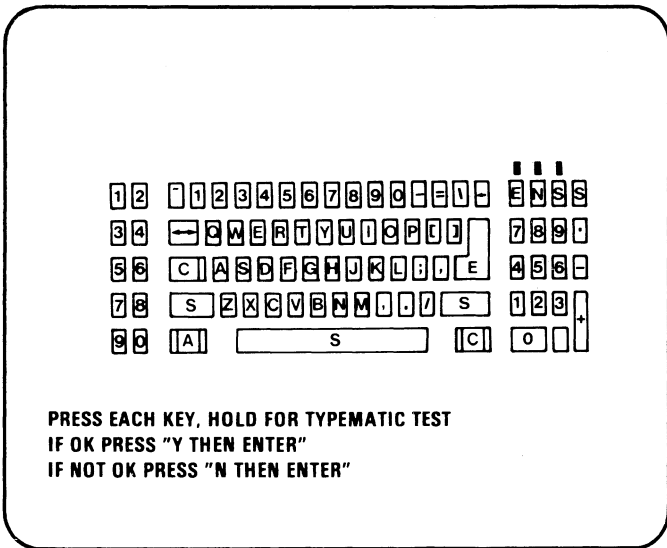
YES Press each key once. When each key is pressed:

- The character for each key pressed appears in its corresponding block on the screen.
- The three squares in the upper right corner of the screen intensify.
- The three status lights on your keyboard come on.
- Go to the next page.

NO Press N and then press .
Go to page 3-300-19.

Did all of the following happen with the keyboard on your screen?

- The character for each key pressed appeared in its corresponding block on the screen.
- The three squares in the upper-right corner of the screen intensified.
- The three status lights on your keyboard came on.



YES Go to the next page.

NO Have your keyboard serviced.

Perform the instructions for the typematic and keyboard status light test.

1. Press and hold down any key. The corresponding character blinks on the screen.
2. Press and release the Caps Lock, Num Lock, and the Scroll Lock. The squares in the upper-right corner of your screen change their intensity. Also verify that the status lights on your keyboard go off.

If steps 1 and 2 of the typematic test work correctly, go to page 3-300-17.

If step 1 failed, go to the next page.

If step 2 failed, install a new keyboard.

Set the power switch of the system unit to Off, wait for 5 seconds, then set the switch to On.

Select the graphics display/attachment unit test 44. When the menu appears, select option 5 (emulator interactive tests).

Look for the line that states **This line is blinking**.

IS THE LINE PRESENT AND BLINKING?

NO Go to page 3-4400-1.

YES Install a new keyboard.

**DOES A "O" CHARACTER (OVERRUN) APPEAR IN
THE SPACE AT THE TOP-RIGHT OF THE SCREEN?**

- YES** You may have been keying too quickly. Leave the keyboard test and start the test again. Key at a slower rate. If the "O" character still appears, install a new keyboard.
- NO** Go to the next page.

**DO ANY OF THE FOLLOWING CHARACTERS
APPEAR IN THE SPACE AT THE TOP RIGHT OF
THE SCREEN: X, U, D, E?**

YES Install a new keyboard, see Chapter 5, page 5-1.

NO Press **Y** then **←**.
You have successfully completed the keyboard
advanced diagnostics tests. If you suspect an
intermittent problem, go to page 3-010-1.

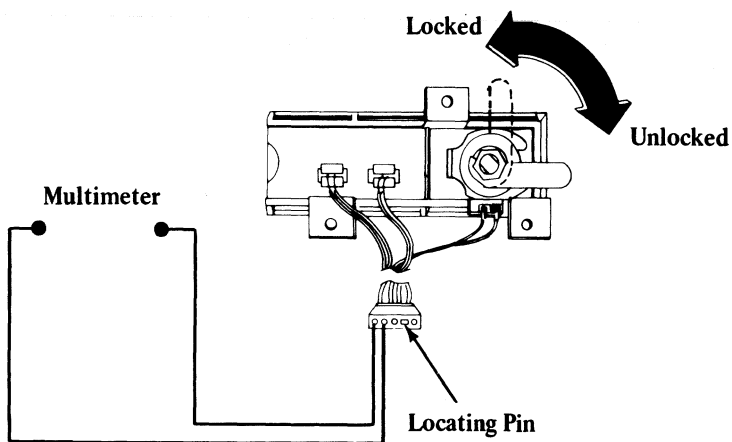
IS ANY 3XX POST ERROR CODE DISPLAYED?

NO Install a new keyboard, see Chapter 5, page 5-1.

YES Go to the "3XX Error Code Table" on
page 3-300-21.

1. Set the power switch on the system unit to Off.
2. Remove the system unit cover. See Chapter 5, page 5-1.
3. Disconnect the control panel cable from the system board. See Chapter 5, page 5-1.
4. Set your meter to the Ohms X 1 scale.
5. Check the control panel switch, as shown below.

-
- Key Lock Locked = Continuity (0 Ohms)
 - Key Lock Unlocked = No Continuity (Infinity)



DOES THE CONTROL PANEL SWITCH MEET BOTH CONDITIONS SHOWN IN THE FIGURE ABOVE?

-
- NO** Install a new Control Panel. See Chapter 5, page 5-1.
- YES** Install a new system board. See Chapter 5, page 5-1.

3XX Error Code Table

You have recorded a 3XX error code. Use the table below to determine the most probable FRU that has failed or the best action to take.

<u>Code</u>	<u>1st</u>	<u>2nd</u>
XX 301	See Note below	
301	Go to page 3-300-22	
303 & 304	Go to page 3-300-22	
317	Go to page 3-300-20	
358	Keyboard	System Board
359	Keyboard	
369	Keyboard	System Board
370 to 374	Keyboard	System Board
378	Keyboard	System Board

Note:

An XX 301 keyboard error code indicates a key had jammed during POST.

Press the F1 key.

DOES PRESSING THE F1 KEY RESUME THE POST?

NO Install a new keyboard assembly. See Chapter 5, page 5-1.

YES Go to page 3-300-5 to try to identify the jammed key.

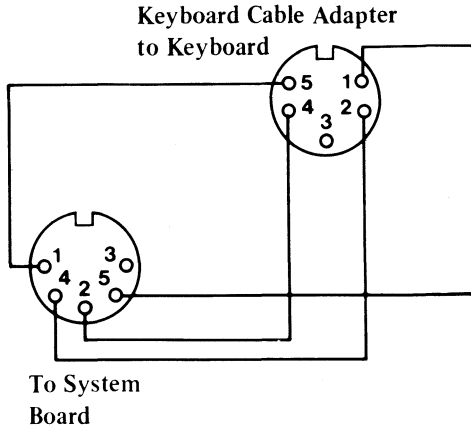
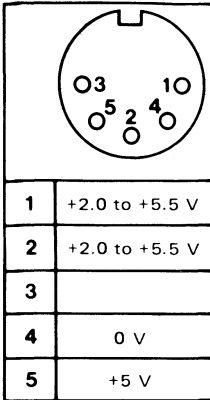
1. Power off the system unit.
 2. Disconnect the keyboard cable (or keyboard adapter cable if installed), from the system unit.
 3. Power on the system unit.
-

DID YOU RECEIVE A 301 ERROR CODE?

NO Install a new system board. See Chapter 5, page 5-1.

YES Measure the voltages at the keyboard socket on the rear of the system unit (see the figure on the next page).

**System Unit Socket
to IBM 3270 Personal
Computer Keyboard
Only**



Note: The Keyboard Adapter Cable is only present on 3270 PC Keyboards.

ARE ALL THE VOLTAGES CORRECT?

NO Install a new system board. See Chapter 5, page 5-1.

YES

1. If the keyboard adapter cable is present, check its continuity (see figure above). If the keyboard adapter cable has continuity, install a new keyboard (see Chapter 5, page 5-1). Otherwise install a new keyboard adapter cable (see Chapter 5, page 5-1).
2. If the keyboard adapter cable **is not** present, install a new keyboard (see Chapter 5, page 5-1).



Second Display (5151 Monochrome Display)

You have entered this PIC because you have a 4XX error code or have identified a monochrome display problem, or you want to test the monochrome display using the advanced diagnostics diskette.

Read *all* of this page before continuing.

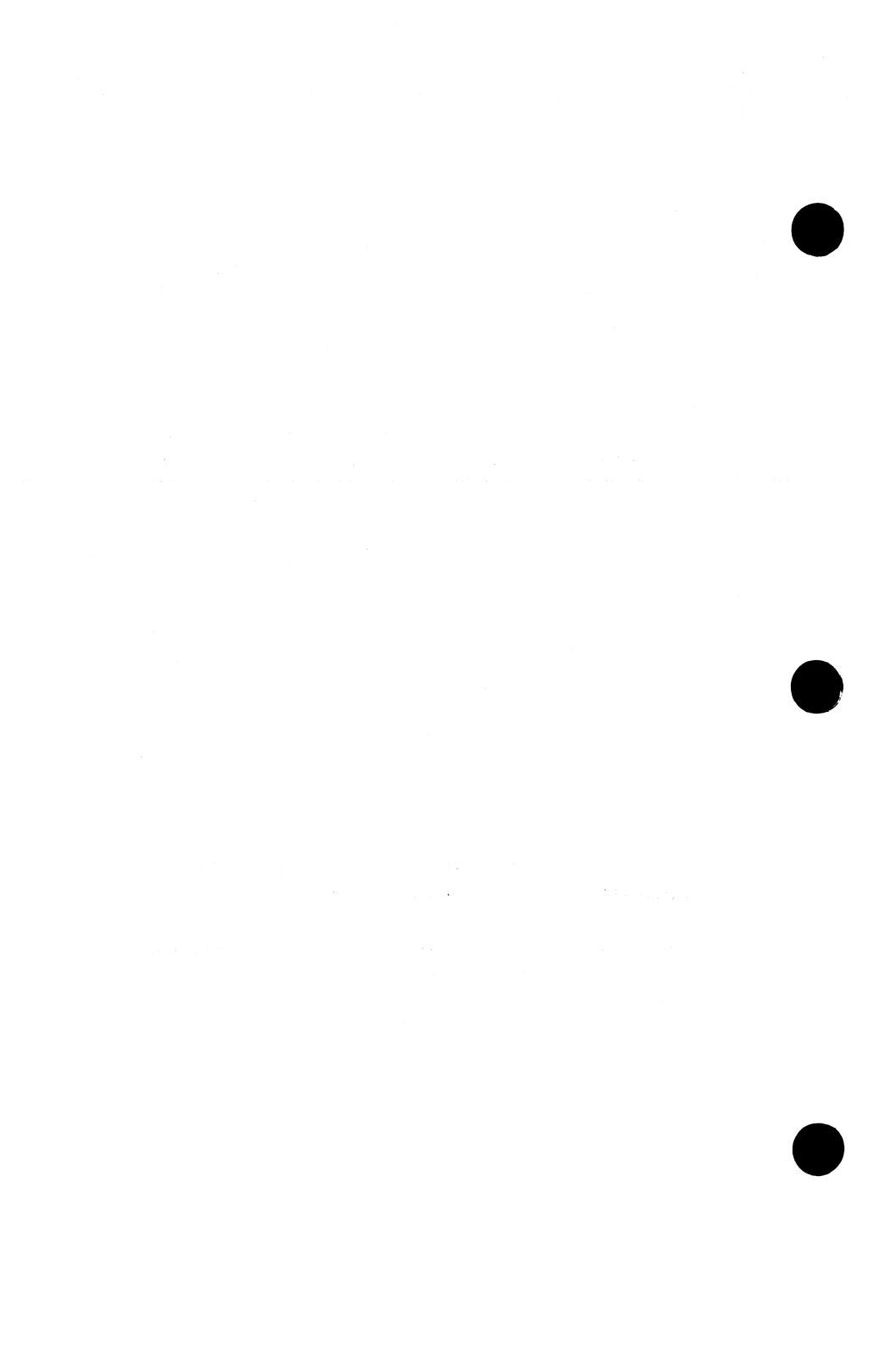
Use the monochrome display PIC on page 3-400-1 of the IBM Personal Computer AT *Hardware Maintenance and Service*, to solve monochrome display adapter problems.

Notes:

1. *When instructed in the Monochrome Display PIC to:*

- *Power off the system unit, you should power off the work station in the correct sequence (see Chapter 1, page 1-17).*
- *Power on the system unit, you should power on the work station in the correct sequence (see Chapter 1, page 1-18).*
- *Use the advanced diagnostics diskette, you should use the advanced diagnostics diskette **that is shipped with this book.***

2. *Return to this book, if necessary, after you have solved the monochrome display problems.*



Diskette Drive Assembly

You have entered this PIC because you have a 6XX error code or have identified a diskette drive assembly problem, or you want to test the diskette adapter using the advanced diagnostics diskette. If the diskette drive assembly has visible obstructions or broken parts, remove them or install a new FRU. Check the diskette for damage.

Read *all* of this page before continuing.

Use the Diskette Drive PIC on page 3-600-1 of the IBM Personal Computer AT *Hardware Maintenance and Service*, to solve diskette drive, fixed disk, or diskette drive adapter problems.

Notes:

1. *When instructed in the Diskette Drive PIC to:*

- *Power off the system unit, you should power off the work station in the correct sequence (see Chapter 1, page 1-17).*
- *Power on the system unit, you should power on the work station in the correct sequence (see Chapter 1, page 1-18).*
- *Use the advanced diagnostics diskette, you should use the advanced diagnostics diskette **that is shipped with this book.***

2. *Return to this book, if necessary, after you have solved the diskette drive problems.*

Dear Mr. [Name],

I have received your letter of the 15th and am sorry that I cannot give you a more definite answer at this time.

The matter is being reviewed and I will contact you again as soon as a final decision has been reached.

I am sure that you will understand the need for thoroughness in this process.

Very truly yours,
[Signature]

Math Coprocessor

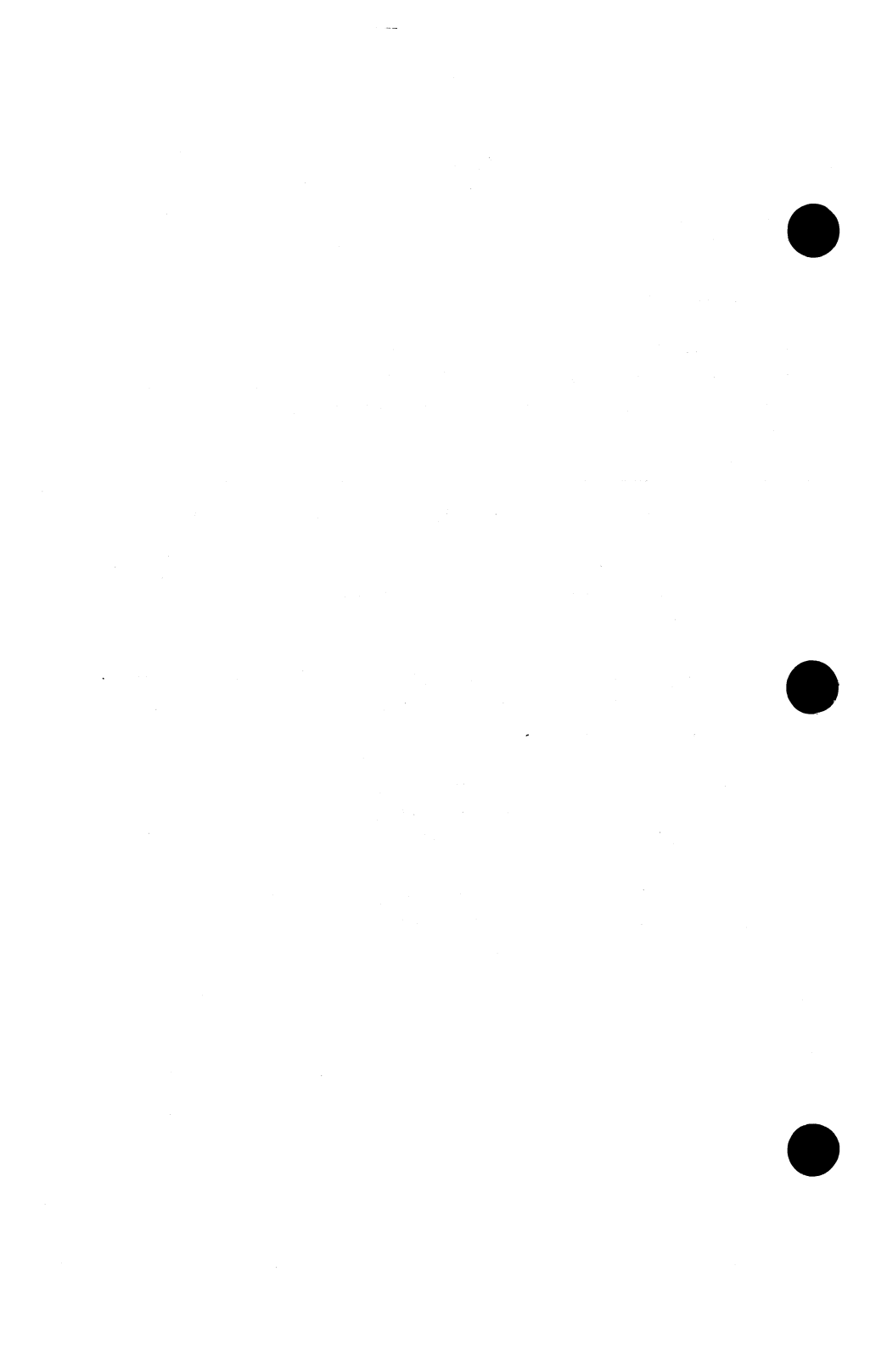
You have entered this PIC because you have a 7XX error code or have identified a math coprocessor problem, or you want to test the math coprocessor using the advanced diagnostics diskette.

Read *all* of this page before continuing.

Use the Math Coprocessor PIC on page 3-700-1 of the IBM Personal Computer AT *Hardware Maintenance and Service*, to solve math coprocessor problems.

Notes:

1. *When instructed in the Math Coprocessor PIC to:*
 - *Power off the system unit, you should power off the work station in the correct sequence, (see Chapter 1, page 1-17).*
 - *Power on the system unit, you should power on the work station in the correct sequence, (see Chapter 1, page 1-18).*
 - *Use the advanced diagnostics diskette; you should use the advanced diagnostics diskette **that is shipped with this book.***
2. *Return to this book, if necessary, after you have solved the math coprocessor problems.*



Serial/Parallel Adapter – Parallel Port

You have entered this PIC because you have a 9XX error code or have identified a serial/parallel adapter – parallel port problem, or you want to test the serial/parallel adapter using the advanced diagnostics diskette.

Read *all* of this page before continuing.

Use the Serial/Parallel Adapter – Parallel Port PIC on page 3-900-1 of the IBM Personal Computer AT *Hardware Maintenance and Service* to solve Serial/Parallel Adapter – Parallel Port problems.

Notes:

1. *When instructed in the Serial/Parallel Adapter – Parallel Port PIC to:*
 - *Power off the system unit, you should power off the work station in the correct sequence (see Chapter 1, page 1-17).*
 - *Power on the system unit, you should power on the work station in the correct sequence (see Chapter 1, page 1-18).*
 - *Use the advanced diagnostics diskette, you should use the advanced diagnostics diskette **that is shipped with this book.***
2. *Return to this book, if necessary, after you have solved the serial/parallel adapter – parallel port problems.*



Alternate Serial/Parallel Adapter – Parallel Port

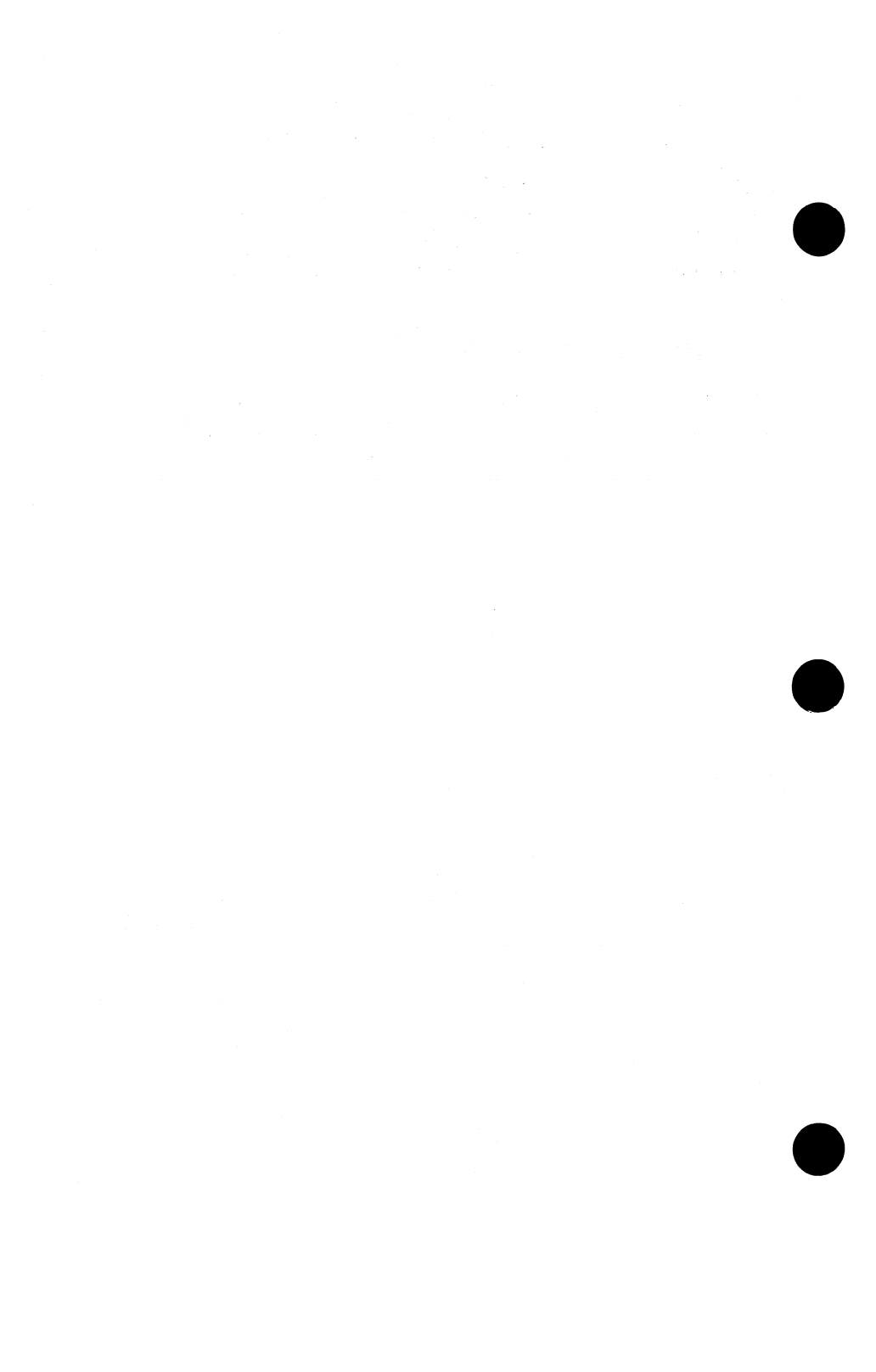
You have entered this PIC because you have a 10XX error code or have identified an alternate serial/parallel adapter – parallel port problem, or you want to test the alternate serial/parallel adapter using the advanced diagnostics diskette.

Read *all* of this page before continuing.

Use the Alternate Serial/Parallel Adapter – Parallel Port PIC on page 3-1000-1 of the IBM Personal Computer AT *Hardware Maintenance and Service* to solve the Alternate Serial/Parallel Adapter – Parallel Port problems.

Notes:

1. *When instructed in the Alternate Serial/Parallel Adapter – Parallel Port PIC to:*
 - *Power off the system unit, you should power off the work station in the correct sequence (see Chapter 1, page 1-17).*
 - *Power on the system unit, you should power on the work station in the correct sequence (see Chapter 1, page 1-18).*
 - *Use the advanced diagnostics diskette, you should use the advanced diagnostics diskette **that is shipped with this book.***
2. *Return to this book, if necessary, after you have solved the alternate serial/parallel adapter – parallel port problems.*



Serial/Parallel Adapter – Serial Port

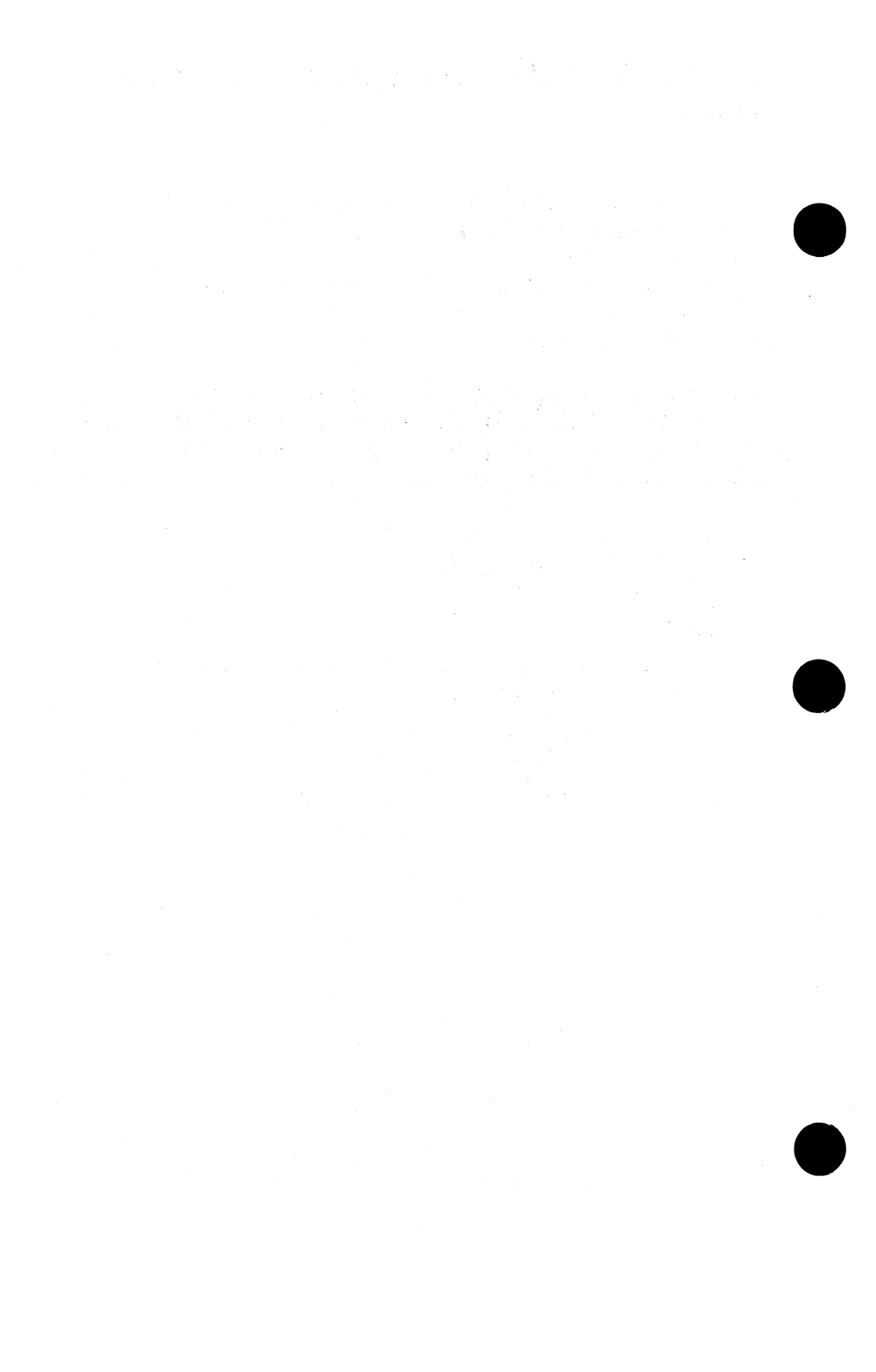
You have entered this PIC because you have an 11XX error code or have identified a serial/parallel adapter – serial port problem, or you want to test the serial/parallel adapter using the advanced diagnostics diskette.

Read *all* of this page before continuing.

Use the Serial/Parallel Adapter – Serial Port PIC on page 3-1100-1 of the IBM Personal Computer AT *Hardware Maintenance and Service* to solve the serial/parallel adapter – serial port problems.

Notes:

1. *When instructed in the Serial/Parallel Adapter – Serial Port PIC to:*
 - *Power off the system unit, you should power off the work station in the correct sequence (see Chapter 1, page 1-17).*
 - *Power on the system unit, you should power on the work station in the correct sequence (see Chapter 1, page 1-18).*
 - *Use the advanced diagnostics diskette, you should use the advanced diagnostics diskette **that is shipped with this book.***
2. *Return to this book, if necessary, after you have solved the serial/parallel adapter – serial port problems.*



Alternate Serial/Parallel Adapter – Serial Port

You have entered this PIC because you have a 12XX error code or have identified an alternate serial/parallel adapter – serial port problem, or you want to test the serial/parallel adapter using the advanced diagnostics diskette.

Read *all* of this page before continuing.

Use the Alternate Serial/Parallel Adapter – Serial Port PIC on page 3-1200-1 of the IBM Personal Computer AT *Hardware Maintenance and Service* to solve the Alternate Serial/Parallel Adapter – Serial Port problems.

Notes:

- 1. When instructed in the Alternate Serial/Parallel Adapter – Serial Port PIC to:*
 - Power off the system unit, you should power off the work station in the correct sequence (see Chapter 1, page 1-17).*
 - Power on the system unit, you should power on the work station in the correct sequence (see Chapter 1, page 1-18).*
 - Use the advanced diagnostics diskette, you should use the advanced diagnostics diskette **that is shipped with this book.***
- 2. Return to this book, if necessary, after you have solved the alternate serial/parallel adapter – serial port problems.*



IBM 5152 (Monochrome) Graphics Printer

**IS THERE AN IBM 5152 MONOCHROME
PRINTER ATTACHED TO THE WORK STATION?**

NO Go to the next test.

YES Go to the next page.

**| DID THE PRINTER RUN WITHOUT ERRORS AND
| PRINT THE TEST PATTERN CORRECTLY?**

| **YES** Go to the next test.

| **NO** Refer to the manual that came with your printer
| and check to see if the printer is:

- | • Switched on
- | • Ready (Online).

| Printers may have their own tests. Refer to the
| manual that came with your printer and run the
| printer tests. If the printer tests work, have the
| system unit serviced. If the printer tests do not
| work, have the printer and cable serviced.

Fixed Disk Unit

You have entered this PIC because you have a 17XX error code or have identified a fixed disk drive problem.

Warning: Normal shipping and handling can cause permanent loss of all data and formatting information from the fixed disk. It is recommended that all files be backed up onto diskettes.

Read *all* of this page before continuing.

Use the Fixed Disk Unit PIC on page 3-1700-1 of the IBM Personal Computer AT *Hardware Maintenance and Service* to solve the fixed disk unit problems.

Notes:

1. *When instructed in the Fixed Disk Unit PIC to:*
 - *Power off the system unit, you should power off the work station in the correct sequence (see Chapter 1, page 1-17).*
 - *Power on the system unit, you should power on the work station in the correct sequence (see Chapter 1, page 1-18).*
 - *Use the advanced diagnostics diskette, you should use the advanced diagnostics diskette **that is shipped with this book.***
2. *Return to this book, if necessary, after you have solved the fixed disk unit problems.*



Distributed Function Communications Adapter

You have entered this PIC because you have a 28XX error message or you have identified a communication problem with your controller, or you want to test the distributed function communications adapter using the advanced diagnostics diskette.

1. If you have not already done so, insert the advanced diagnostics diskette in drive A.
2. Select the distributed function communications adapter test 28.

CONTINUE ON THE NEXT PAGE

Note: On the screen below, X can be any character.

**TESTING -
DISTRIBUTED FUNCTION COMMUNICATIONS ADAPTER**

**XX:XX:XX
ERROR -
DISTRIBUTED FUNCTION COMMUNICATIONS ADAPTER 28XX**

XXXXXXXXXXXXXXXX

PRESS ENTER TO CONTINUE

DOES THE ABOVE SCREEN APPEAR?

- YES** Install a new distributed function communications adapter. See Chapter 5, page 5-1.
- NO** Go to the next page.

**TESTING -
DISTRIBUTED FUNCTION COMMUNICATIONS ADAPTER
ERROR - NOT CONNECTED TO CONTROL UNIT
REPEAT CONNECTION TEST Y/N?**

-

DOES THE ABOVE SCREEN APPEAR?

NO Go to page 3-2800-11.

YES Go to the next page.

You should have a coaxial cable or IBM Cabling System connected to your work station from your control unit.

IS A COAXIAL CABLE OR IBM CABLING SYSTEM ATTACHED TO YOUR WORK STATION?

NO You cannot continue this test without a coaxial cable or IBM Cabling System attached to your work station. To end this test, press N, then ←.

YES Go to the next page.

CAUTION

Do not connect or disconnect the coaxial cable or IBM Cabling System during an electrical storm.

1. Disconnect and reconnect the coaxial cable or IBM Cabling System to your work station.
 2. Press Y, then ←.
-

DOES “CONNECTED TO CONTROL UNIT” APPEAR ON YOUR SCREEN?

YES Your problem is solved. To end the test, press N, then ←.

NO Go to the next page.

Now check to see if there are other work stations attached to the same control unit link as your work station.

ARE THERE OTHER WORK STATIONS ATTACHED TO THE SAME CONTROL UNIT LINK AS YOURS?

NO Go to "Coaxial Connector Resistance Check" on page 3-2800-10.

YES Go to the next page.

Check that the other work stations are working correctly.

**ARE THE OTHER WORK STATIONS WORKING
CORRECTLY?**

NO Use your normal local procedures to report a problem external to your work station.

YES Go to the next page.

CAUTION

Do not connect or disconnect the coaxial cable or IBM Cabling System during an electrical storm.

1. Disconnect the coaxial cable or IBM Cabling System from your work station.
 2. Disconnect the coaxial cable or IBM Cabling System from one of the work stations that is working correctly and connect it to your work station.
 3. Press Y, then **←** to repeat the connection test.
-

DOES "CONNECTED TO CONTROL UNIT" APPEAR ON YOUR SCREEN?

NO Reconnect both your work station and the other work station to their original cables. Install a new distributed function communications adapter.

YES Go to the next page.

1. Reconnect both your work station and the other work station to their original cables.
 2. Press Y, then ←.
-

DOES "CONNECTED TO CONTROL UNIT" APPEAR ON YOUR SCREEN?

NO Use your normal local procedures to report a problem external to your work station.

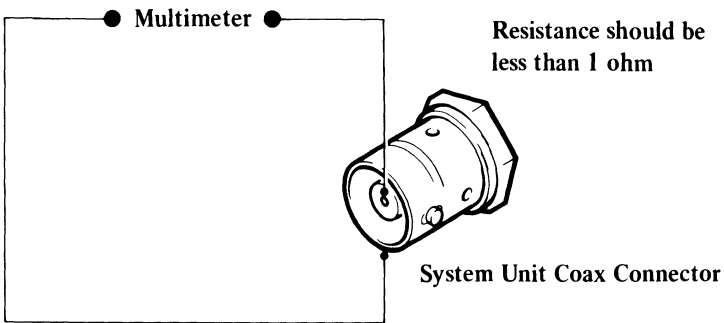
YES The problem is solved. Press N, then ← to end the connection test.

1. Set the power switch of the system unit to Off.

CAUTION

Do not connect or disconnect the coaxial cable or IBM Cabling System during an electrical storm.

2. Disconnect the coaxial cable or IBM Cabling System from the work station.
3. Check the work station-coaxial connector for a resistance of less than 1 ohm.



IS THE RESISTANCE CORRECT?

NO Install a new distributed functions communications adapter. See Chapter 5, page 5-1.

YES Use your normal local procedures for reporting problems external to your work station. If you have gone through these procedures and still have a problem, install a new distributed functions communications adapter. See Chapter 5, page 5-1.

You have gone through the PICs without solving the problem. The following steps should aid you to find additional audio or visual symptoms.

1. Check the complete system for loose or damaged connectors.
 2. Return to page 3-2 and review "Start."
 3. Select UTILITIES in the advanced diagnostics menu, start an error log, and select RUN TESTS MULTIPLE TIMES. This tests the machine thoroughly for a period of time to aid you to identify the failure symptom. When you have identified the symptom, go to page 3-2, "Start," or to the correct PIC for the symptom you received.
-

If you have gone through these procedures and still have a problem, request technical support.



IBM 5182 Color Graphics Printer

For information on the isolation of printer problems and maintenance information relative to those problems, see *IBM 5182 Color Printer Hardware Maintenance and Service, IBM Part 1502383*.



General Purpose Interface Bus Adapter (IEEE-488)

You have entered this PIC because you have a 36XX error code or have identified a general purpose interface bus adapter card problem, or you want to test the general purpose interface bus adapter using the advanced diagnostics diskette.

Read *all* of this page before continuing.

Use the general purpose interface bus adapter PIC on page 3-3600-1 of the IBM Personal Computer AT *Hardware Maintenance and Service*, to solve general purpose interface bus adapter problems.

Notes:

1. When instructed in the General Purpose Interface Bus Adapter card PIC to:

- *Power off the system unit, you should power off the work station in the correct sequence (see Chapter 1, page 1-17).*
- *Power on the system unit, you should power on the work station in the correct sequence (see Chapter 1, page 1-18).*
- *Use the advanced diagnostics diskette, you should use the advanced diagnostics diskette **that is shipped with this book.***

2. Return to this book, if necessary, after you have solved the general purpose interface bus adapter problems.



5378 Display Attachment Unit, 5379 Display Monitor, Mouse, Tablet and Timers

5378 DAU - CARD ABBREVIATIONS AND LOCATIONS

DBR	Display bus receiver	A1-D2
GP	Graphics processor	A1-C2
SC	System control	A1-B2
UC	Update control	A1-A2
CVD	Clock and video driver	B1-A2
BP4/5	Bit plane 4/5	B1-B2
BP2/3	Bit plane 2/3	B1-C2
BP0/1	Bit plane 0/1 (Model C01 only)	B1-D2

5378 DISPLAY ATTACHMENT UNIT AND 5379 DISPLAY AND DISPLAY/MOUSE/TABLET ADAPTER CARD ENTRY POINT

If you have a known Mouse/Tablet problem, go to page 3-4400-76.

If you have a known EMA Extended Memory Adapter problem go to page 3-4400-97.

- a. -Power off the work station in the correct sequence (system unit first).
- Remove the system unit cover.
- Remove any diskette from the system unit.
- Power on the work station in the correct sequence (system unit last).
- Observe the screen(s) and wait 1 minute.
- Review the figures of test patterns in Chapter 2.

NOTE: When the 5378 DAU is connected to the system unit, a test pattern is only displayed when a failure occurs.

If a test pattern is displayed on the 5379, go to page 3-4400-4.

If none, go to b.

TABLE CONTINUES ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT AND
5379 DISPLAY AND DISPLAY/MOUSE/TABLET
ADAPTER CARD ENTRY POINT

- b. If the 5378 fans are not running, go to page 3-4400-39.
If OK, go to c.
- c. If the 5379 is a Model M01, go to d.
If the 5379 is a Model C01, and the fan is not running, go to page 3-4400-59.
If OK, go to d.
- d. If the 5379 screen brightness is intermittent (flashing) go to 3-4400-75 step c.
Complete the instructions then return to this page, go to step e.
If OK, go to e.
- e. If a number is displayed on the hex LED located on the display/mouse/tablet adapter in the system unit, go to page 3-4400-8 (5378 Entry).
If no number, go to f.
- f. -Check that the video cables (3), (4), and (5), are correctly connected to the sockets J3, J4, and J5 on the rear of the 5378.
(If 5379 is a Model M01, only J4 is used.)
If not correct, replug correctly.
If OK, go to g.
- g. -Disconnect the video cables (3), (4), and (5) from the sockets at the rear of the 5378 DAU.
(If 5379 is a Model M01, only J4 is used.)
-Rotate the brightness control on the side of the 5379 fully downward.
If no raster is visible, go to page 3-4400-53 (5379 Entry).
If the raster is colored (not white or gray) Model C01 only, go to 3-4400-69.
Else go to h.
- h. -Press the test switch on the side of the 5379 to display the test bars.
12 to 16 white, stable, vertical bars should be displayed on the 5379.
If the bars are not displayed correctly, go to page 3-4400-53 (5379 Entry).
Else go to i.

TABLE CONTINUES ON NEXT PAGE

5378 DISPLAY ATTACHMENT UNIT AND
5379 DISPLAY AND DISPLAY UNIT/MOUSE/TABLET
ADAPTER CARD ENTRY POINT

- i. -Press and hold the test switch.
-Check that the background and foreground brightness levels of the image on the display varies as the brightness control on the side of the display is rotated.
If it does not vary, go to page 3-4400-53 (5379 Entry).
If 5379 is a Model M01, go to k.
Else go to j.
- j. -Press and hold the test switch on the side of the 5379.
-Press the manual degauss switch.
The image should waver for a few seconds while the degauss occurs.
(Do not repeat this test for at least 15 seconds.)
If it does not waver, go to page 3-4400-53 (5379 Entry).
Else go to k.
- k. -Reconnect the video cables to the 5378 DAU.
Go to page 3-4400-8 (5378 Entry).

5378 DAU / 5379 DISPLAY TABLE COM1
 (Test pattern is displayed on the 5379
 after system unit is switched On)

- a. -Power off the work station in the correct sequence (system unit first).
 -Wait for 5 seconds.
 -Power on the work station in the correct sequence (system unit last).
 -Listen carefully (up to 2 minutes) for the system unit to beep.
 Go to the PIC that corresponds to the symptom you hear:

Symptom - = long beep ● = short beep	PIC
No beeps	3-4400-5
●	3-4400-6
- ● ● ● ●	3-4400-7
- ● ● - ● ● ● ●	3-4400-7
Any other pattern of beeps	3-020-1 (Undetermined problems)

5378 DAU / 5379 DISPLAY TABLE COM2
(Test Pattern on screen AND no beeps)

- a. -Power off the work station in the correct sequence (system unit first).
-Disconnect the system-unit-to-DAU cable at the DAU end.
-Power on the work station in the correct sequence (system unit last).
-Listen carefully (up to 2 minutes) for beeps.
If no beeps, go to c.
Else go to b.
- b. -Power off the work station correctly.
-Reconnect the system-unit-to-DAU cable.
-Remove the DAU cover.
-Unseat the flexi-cable from A1D2.
-Power on the work station correctly.
If no beeps, install a new bus receiver flexi-cable.
Else go to c.
- c. -Power off the work station correctly.
-Disconnect the system-unit-to-DAU cable at the system unit end.
-Power on the work station correctly.
If the system unit beeps, go to e.
Else go to d.
- d. -Power off the work station correctly.
-Unseat the display/mouse/tablet adapter card in the system unit.
-Power on the work station correctly.
If the system unit beeps, install a new display/mouse/tablet adapter in the system unit.
Else go to page 3-020-1 (Undetermined Problems).
- e. Check the system-unit-to-DAU cable for continuity and no shorts (or try another system-unit-to-DAU cable, if available).
If non-continuity or shorts are found (or the fault was eliminated when you tried another cable) install a new cable.
Else install a new display/mouse/tablet adapter in the system unit.

5378 DAU / 5379 DISPLAY TABLE COM3
(Test Pattern on screen AND one short beep)

- a. -Power off the work station in the correct sequence (system unit first).
-Disconnect the system-unit-to-DAU cable at both ends.
-Check for continuity on pin 25 (- Display Present) in this cable (see Chapter 4).
If continuity is bad, install a new cable.
Else go to c.
- b. -Measure the resistance between pins 25 and 62 (ground) on connector J7 at the rear of the DAU (see Figure 4-10 on page 4-10).
If resistance is greater than 2 ohms, install a new bus receiver flexi-cable in the 5378.
If resistance is OK, install a new display unit adapter in the system unit.

5378 DAU / 5379 DISPLAY TABLE COM4

(Test Pattern or blank screen AND three or more beeps)

- a. -Power off the work station in the correct sequence (system unit first).
-Disconnect the system-unit-to-DAU cable at the DAU end.
-Power on the work station in the correct sequence (system unit last).
-Listen carefully (up to 2 minutes) for beeps.
If you hear 1 beep go to c.
Else go to b.
- b. -Power off the work station correctly.
-Disconnect the system-unit-to-DAU cable at the system unit end.
-Power on the work station correctly.
If you hear 1 beep, install a new system-unit-to-DAU cable. If you hear no beeps or more than one beep, install a new display/mouse/tablet adapter. If the problem persists, install a new system board.
- c. -Check the system-unit-to-DAU cable for continuity and no shorts (or try another system-unit-to-DAU cable, if available).
If non-continuity or shorts are found (or the fault was eliminated when you tried another cable) install a new cable.
Else go to d.
- d. -Power off the work station correctly.
-Remove the DAU cover.
-Disconnect the bus receiver flexi-cable from the A1 gate.
-Check the bus receiver flexi-cable between J7 and the logic board for continuity and no shorts (see Chapter 4).
If continuity is bad, install a new flexi-cable.
Else go to e.
- e. -Install a new DBR card, then, if necessary, a new GP card, then, if necessary, a new SC card, then if necessary, a new display/mouse/tablet adapter.

5378 DISPLAY ATTACHMENT UNIT ENTRY

- a. -Power off the system unit, then the DAU.
- Remove the DAU cover if not already removed.
- Check all the DAU logic cards and connectors for correct seating.
- See Chapter 2, page 2-5 for reading error codes on the hex LED, then continue from here with this procedure.
- Power on the 5378 DAU, then the system unit. The system unit POST should now run. Test numbers should be displayed briefly on the 5379 display in WHITE with a black background.
- If three beeps occur (one long, two short), observe any error code displayed on the hex LED (or second screen if attached).
- Observe if anything is displayed on the hex LED.
- Select the FIRST symptom that matches your problem from the table on the next page.

Use the FIRST symptom that matches your problem
 NOTE: A blank screen means nothing displayed
 at all, or only a raster is displayed.

Symptom	Go to Page:
DAU fan(s) stopped or slow	3-4400-39
Error code on screen or LED	3-4400-11
Test Pattern F0 through F4 on the 5379 (see figures in Chapter 2); and no beeps	3-4400-4
Blank screen, and hex LED always blank	3-4400-44
System unit POST stopped, with a static number on the hex LED but no error code, and blank screen	3-4400-47
POST ran through to completion (single beep), and blank screen	3-4400-45
POST ran through to completion (single beep), and rolling or unstable image (bad sync)	3-4400-46
POST ran through to completion (single beep), and test numbers wrong color or background problem	3-4400-34
POST ran through to completion (single beep), and no test numbers on 5379	3-4400-34
POST ran through to completion (single beep), with background problem only when test numbers should be displayed on 5379	3-4400-34
Three beeps but no test pattern displayed.	3-4400-7
Any other symptom	3-4400-10

5378 DISPLAY ATTACHMENT UNIT - TABLE DAUO

- a. -Power off the work station in the correct sequence (system unit first).
If the 5379 is a Model M01, go to b.
-Insert the advanced diagnostics diskette in drive A of the system unit and rotate the load lever downward.
-Power on the work station correctly (system unit last).
-Wait for up to 2 minutes for the diskette to stop and the diskette drive LED to go off.
-Review the Diagnostics Menu Reference in Chapter 2.
-The advanced diagnostics start screen (menu 2) is displayed on the screen.
-Press 0, then <—>, to run diagnostic routines.
-Wait until menu 3 is displayed, press Y, then <—>.
-Wait until menu 4 is displayed, press 0, then <—> to run tests one time.
-Wait until menu 5 is displayed, key 44, then press <—> to select graphics display/attachment unit.
-Wait until menu 8A is displayed, key 11, then press <—> to select one display unit test.

The DAU test patterns F0 through F4 can now be selected by keying the pattern number, then pressing the keys <—>, N, <—>, N, and <—>. To end the display of any pattern press <—>. Continue with step b.

- b. If you have a 5378 model C01 DAU, you should display patterns F0 through F4.
If you have a 5378 model M01, power on the DAU; test pattern F1 only is displayed.
If you have a 5379 model C01 display, ignore the color of patterns F0 and F1.
-Compare each pattern carefully to the corresponding pattern in Chapter 2.
If any pattern is not displayed correctly, go to page 3-4400-31.
Else press <—> and go to page 3-4400-76.

5378 DISPLAY ATTACHMENT UNIT - TABLE DATA

-If the error codes displayed on the 5379 and the hex LED differ, use the 5379 code.
 In Error Code column, X = any hex number.
 -Use the FIRST symptom that matches your problem

ERROR CODE ←-screen→ ←-LED→	ACTION Install new FRU or go to page indicated		
	1	2	3
4440 (FFE7)	GP	SC	
4440 (FFFE)	GP		
4440 (XXE0)	SC	GP	
4440 (XXE1)	SC	GP	
4440 (XXE2)	UC	GP	SC
4440 (XXE3)	SC	GP	DBR
4440 (XXE4)	SC	GP	
4440 (XXE5)	UC	GP	SC
4440 (XXE6)	UC	GP	SC
4440 (XXE7)	GP	SC	
4440 (XXF1)	DBR		
4440 (XXFB)	GP	SC	
4440 (XXFC)	GP		
4440 (XXFD)	GP		
4440 (XXFE)	3-4400-23		
44x0 (0XXX)	3-4400-12		
4440 (1XXX)	3-4400-13		
4430 (2XXX)	3-4400-14		
4440 (3XXX)	3-4400-15		
4440 (4XXX)	3-4400-16		
4440 (5XXX)	GP		
4440 (6XXX)	GP		
4440 (7XXX)	3-4400-17		
4440 (8XXX)	GP		
4440 (9XXX)	3-4400-18		
4440 (AXXX)	GP		
4440 (BXXX)	3-4400-19		
4440 (CXXX)	3-4400-20		
4440 (DXXX)	GP		
4440 (EXXX)	3-4400-21		
4440 (FXXX)	3-4400-22		

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU2			
ERROR CODE ←-screen-→ ←-LED-→	ACTION Install new FRU or go to page indicated		
	1	2	3
4410 (0100)	DBR		
4410 (0200)	DBR		
4410 (0300)	DBR		
4410 (0400)	DBR		
4410 (0500)	DBR	GP	SC
4410 (0600)	DBR		
4410 (6XXX)	3-4400-76		
4420 (0700)	3-4400-44		
4410 (7XXX)	3-4400-76		
4430 (0800)	DBR		
4430 (0900)	DBR		
4430 (0A00)	DBR		
4430 (0B00)	DBR		
4430 (0C00)	DBR		
4430 (0C01)	3-4400-28		
4430 (0C02)	DBR		
4430 (0C03)	DBR		
4430 (0C04)	DBR		
4430 (0C05)	DBR		
4430 (0C06)	DBR	SC	
4430 (EXXX)	3-4400-21		
0XXX error but none of the above	GP	DBR	

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU3 In Error Code column, X = any hex number			
ERROR CODE ←-screen→ ←-LED→	ACTION Install new FRU or go to page indicated		
	1	2	3
4440 (1000)	3-4400-23		
4440 (1001)	3-4400-23		
4440 (1002)	GP		
4440 (1003)	GP		
4440 (1004)	GP	SC	UC
4440 (1005)	GP	SC	
4440 (100B)	3-4400-25		
4440 (1014)	GP		
4440 (1060)	3-4400-23		
4440 (10C4)	GP	DBR	
4440 (10FF)	3-4400-43		
4440 (10XX)	3-4400-23		
4440 (1100)	UC	SC	GP
4440 (1101)	UC	SC	GP
4440 (1102)	UC	GP	SC
4440 (1103)	SC		
4440 (1104)	GP	SC	
4440 (1114)	GP	SC	
1XXX error but none of the above	GP	SC	UC

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU4			
ERROR CODE ←-screen→ ←-LED→	ACTION Install new FRU or go to page indicated		
	1	2	3
4430 (2000)	DBR		
4430 (2100)	DBR	GP	SC
4430 (2200)	GP	DBR	SC
4430 (2300)	GP	SC	
2XXX error but none of the above	GP		

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU5
 In Error Code column, X = any hex number

ERROR CODE ←screen→ ←LED→	ACTION Install new FRU or go to page indicated		
	1	2	3
4440 (3000)	3-4400-38		
4440 (3001)	UC	SC	GP
4440 (3002)	UC		
4440 (3003)	UC	GP	
4440 (3004)	UC		
4440 (3100)	UC		
4440 (3101)	3-4400-23		
4440 (3102)	3-4400-23		
4440 (3103)	UC		
4440 (3104)	UC		
4440 (3200)	SC		
4440 (3201)	UC		
4440 (3202)	UC		
4440 (3203)	UC		
4440 (3204)	UC		
4440 (3205)	UC		
4440 (3206)	UC		
4440 (3207)	UC		
4440 (33XX)	UC		
4440 (3400)	UC		
4440 (3401)	3-4400-23		
4440 (3402)	3-4400-23		
4440 (35XX)	UC		
4440 (36XX)	UC	SC	
3XXX error but none of the above	GP	UC	

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU6

ERROR CODE ←-screen-→ ←-LED-→	ACTION Install new FRU or go to page indicated		
	1	2	3
4440 (4000)	SC		
4440 (4001)	3-4400-38		
4440 (4002)	SC		
4440 (4003)	SC		
4440 (4004)	SC		
4440 (4005)	SC		
4440 (4006)	3-4400-23		
4440 (4007)	SC		
4440 (4008)	SC		
4440 (4009)	SC	GP	
4440 (400A)	SC		
4440 (400B)	SC		
4440 (400C)	SC		
4440 (4101)	SC	UC	
4440 (4102)	SC	UC	
4440 (4103)	SC	UC	
4440 (4201)	3-4400-38		
4440 (4202)	SC		
4440 (4203)	SC		
4440 (4204)	SC		
4440 (4205)	SC		
4440 (4206)	SC		
4XXX error but none of the above	GP	SC	

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU7 In Error Code column n = any number 0 to 5			
ERROR CODE ←-screen→ ←-LED→	ACTION Install new FRU or go to page indicated		
	1	2	3
4440 (7000)	3-4400-23		
4440 (7001)	3-4400-23		
4440 (7100)	3-4400-23		
4440 (711n)	3-4400-23		
4440 (714n)	UC		
4440 (7200)	UC		
4440 (7201)	3-4400-23		
4440 (724n)	UC		
7XXX error but none of the above	GP	UC	

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU8			
ERROR CODE <-screen-> <-LED->	ACTION Install new FRU or go to page indicated		
	1	2	3
4440 (9000)	GP		
4440 (9002)	GP		
4440 (9003)	GP		
4440 (9100)	GP		
4440 (9102)	GP		
4440 (9103)	GP		
4440 (9200)	GP		
4440 (9202)	GP		
4440 (9203)	GP		
4440 (9300)	GP		
4440 (9302)	GP		
4440 (9303)	GP		
4440 (9400)	GP		
4440 (9402)	GP		
4440 (9403)	GP		
4440 (9500)	GP		
4440 (9504)	GP		
4440 (9600)	GP	DBR	
4440 (9605)	GP	DBR	
4440 (9606)	GP		
9XXX error but none of the above	GP		

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU9 In Error Code column, n = any number 0 to 5			
ERROR CODE ←-screen→ ←-LED→	ACTION Install new FRU or go to page indicated		
	1	2	3
4440 (B000)	3-4400-23	UC	
4440 (B001)	SC		
4440 (B01n)	3-4400-23		
4440 (B02n)	3-4400-23		
4440 (B100)	3-4400-23		
4440 (B11n)	3-4400-23		
4440 (B200)	3-4400-23		
4440 (B21n)	3-4400-23		
4440 (B22n)	3-4400-23		
4440 (B300)	3-4400-23		
4440 (B32n)	3-4400-23		
4440 (B33n)	3-4400-23		
4440 (B34n)	3-4400-23		
BXXX error but none of the above	GP		

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU10 In Error Code column, X = any hex number			
ERROR CODE ←-screen→ ←-LED→	ACTION Install new FRU or go to page indicated		
	1	2	3
4440 (C000)	GP		
4440 (C004)	GP		
4440 (C200)	GP		
4440 (C201)	GP		
4440 (C300)	GP		
4440 (C301)	GP		
4440 (C400)	GP		
4440 (C401)	GP		
4440 (C4XX)	GP		
4440 (C500)	UC	DBR	
4440 (C501)	GP		
4440 (C502)	SC	DBR	
CXXX error but none of the above	GP		

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU11 In Error Code column, X = any hex number			
ERROR CODE ←-screen→ ←-LED→	ACTION Install new FRU or go to page indicated		
	1	2	3
4430 (E000)	GP		
4430 (E100)	DBR		
4430 (E200)	SC	GP	DBR
4430 (E300)	GP	DBR	
4430 (E5XX)	DBR	DMTA	
4430 (E600)	DBR	DMTA	
4430 (E700)	DBR		
4430 (E800)	DBR		
4440 (EEF0)	GP		
4440 (EEF2)	GP		
EXXX error but none of the above	GP		

DMTA = Display/Mouse/Tablet Adapter in system unit
ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT — TABLE DAU12 In Error Code column, X = any hex number			
ERROR CODE ←screen→ ←LED→	ACTION Install new FRU or go to page indicated		
	1	2	3
4440 (FX01)	GP		
4440 (FFE7)	GP	SC	
4440 (FFFE)	* (see notes below)		
FXXX error but none of the above	GP		

Notes:

1. If a 4440(FFFE) error code occurs in POST, install a new GP card.
2. If the error code occurs in a screen similar to the one below, and only during the application program, it is due to a microcode problem. Request technical assistance.

4440 (FFFE)

```

STACK XXXXXXXX XXXXXXXX ..... XXXXXXXX
      XXXXXXXX XXXXXXXX ..... XXXXXXXX
D0-7 XXXXXXXX XXXXXXXX ..... XXXXXXXX
A0-7 XXXXXXXX XXXXXXXX ..... XXXXXXXX

PC USP SR LEVEL XXXXXXXX ..... XXXXXXXX
    
```


8 Blocks of 8 Characters 

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU13

Action

- a. -Power off the system unit, then the 5378 DAU.
-Unseat bit plane 0/1 card.
(-If card not installed, go to b).
-Power on the DAU, then the system unit.
If there is no error code, install a new bit plane card.
Else go to b.
- b. -Power off the system unit, then the 5378 DAU.
-Reseat bit plane 0/1 card if unseated.
-Unseat bit plane 2/3 card.
-Power on the DAU, then the system unit.
If there is no error code, install a new bit plane 2/3 card.
Else go to c.
- c. -Power off the system unit, then the 5378 DAU.
-Reseat bit plane 2/3 card if unseated.
-Unseat bit plane 4/5 card.
-Power on the DAU, then the system unit.
If there is no error code, install a new bit plane 4/5 card.
Else go to d.
- d. -Power off the system unit, then the 5378 DAU.
-Reseat bit plane 4/5 card.
Go to page 3-4400-24.

ERROR CODE TABLES CONTINUE ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU14
 In Error Code column, X = any hex number

ERROR CODE <-screen--> <-LED->	ACTION Install new FRU or go to page indicated		
	1	2	3
Select on original error code:			
4440 (XXFE)	GP	UC	
4440 (10XX)	3-4400-25		
4440 (310X)	UC	GP	
4440 (340X)	UC		
4440 (4006)	SC	UC	
4440 (7000)	UC		
4440 (7001)	UC	SC	
4440 (71XX)	UC	SC	
4440 (7201)	UC	CVD	
4440 (B0XX)	UC	SC	
4440 (B1XX)	UC		
4440 (B2XX)	UC	SC	
4440 (B3XX)	UC	SC	
none of these	GP	UC	

Action

- a. -Power off the system unit, then the 5378 DAU.
-Remove all 4 cards from the A1 gate.
-On the CARD SIDE of the board, connect a jumper between A1-A2U11 (+Inhibit IO DTACK) and A1-A2U08 (ground) (see Chapter 4).
-Reseat SC, GP, and BR (but not UC).
-Run DAU tests 2 and 9 using the advanced diagnostics diskette (see procedures on pages 3-4400-26 and 3-4400-27).
- b. -Power off the system unit, then the 5378 DAU.
-Remove the jumper and reseat UC.
If both tests run without error, install a new UC card, then, if necessary, a new SC card.
If errors occur, install a new GP card, then, if necessary, a new SC card, then a new DBR card.

Instructions for running DAU tests 2 and 9 from the advanced diagnostics diskette

- Switch Off the work station correctly (system unit first).
- Load the advanced diagnostics diskette in drive A.
- Rotate the load lever downward.
- Switch On the work station (system unit last).
- Three beeps (one long and two short) occur.
- Wait (for up to 2 minutes) for 2 short beeps, then press the PF1 key to continue POST tests.
- Wait until the diskette stops and you hear a short beep.
- Perform the steps (on the next page) in sequence and listen for the correct audio response each time you press <—>.
- If the correct audio response is not received, start this procedure again.

TABLE CONTINUES ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

Steps	Approx Time Delay	Audio Response	Test Description
1. Press 0 then <—	30 secs	1 beep	Run advanced diagnostics
2. Press Y then <—	1 sec	1 beep	Monitor attached
3. Press Y then <—	1 sec	1 beep	List is correct
4. Press 0 then <—	1 sec	1 beep	Run test one time
5. Enter 44 press <—	2 secs	2 beeps	Graphics display/DAU
6. Enter 11 press <—	1 sec	1 beep	Select one display unit test
7. Enter 2,9 press <— (see Note)	1 sec	1 beep	Run tests 2 and 9
8. Press N then <—	1 sec	1 beep	Do not loop the tests
9. Press N then <—	1 sec	1 beep	Do not stop on error

Note. You should key "2" then ", "(comma), and then "9" before pressing <—.

- Wait for up to 1 minute while tests 2 and 9 run.
- Listen carefully for the audible response. If there is one long beep followed by one short beep, an error has occurred. If there are no beeps, an error has occurred. If there is one short beep only, the tests ran without error.
- Return to page 3-4400-25, step b.

Action

- a. -Power off the system unit, then the DAU.
-Remove all 4 cards from the A1 gate.
-On the CARD SIDE of the board, connect a jumper between A1-A2U11 (+Inhibit IO DTACK) and A1-A2U08 (ground)
(see Figure 4-14 on page 4-15).
-Reseat SC, GP, and BR (but not UC).
-Run DAU test 0 using the advanced diagnostics diskette (see procedures on pages 3-4400-29 and 3-4400-30).
- b. -Power off the system unit, then the 5378 DAU.
-Remove the jumper and reseal UC.
If the test runs without error, install a new UC card, then, if necessary, a new SC card.
If errors occur, install a new GP card, then, if necessary, a new DBR card, then a new SC card.

Instructions for running DAU test 0 from the advanced diagnostics diskette

- Switch Off the work station correctly (system unit first).
- Load the advanced diagnostics diskette in drive A.
- Lower the load lever.
- Switch On the work station (system unit last).
- Three beeps (1 long, 2 short) occur.
Wait (for up to 2 minutes) for 2 short beeps, then press the PF1 key to continue POST tests.
- Wait until the diskette stops and you hear a short beep.
- Perform the steps (on the next page) in sequence and listen for the correct audio response each time you press .
- If the correct audio response is not received, start this procedure again.

TABLE CONTINUES ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

Steps	Approx Time Delay	Audio Response	Test Description
1. Press 0 then <—	30 secs	1 beep	Run advanced diagnostics
2. Press Y then <—	1 sec	1 beep	Monitor attached
3. Press Y then <—	1 sec	1 beep	List is correct
4. Press 0 then <—	1 sec	1 beep	Run test one time
5. Select 44 press<—	2 secs	2 beeps	Graphics display/DAU
6. Select 11 press<—	1 sec	1 beep	Select one display unit test
7. Enter 0 then <—	1 sec	1 beep	Run test 0
8. Press N then <—	1 sec	1 beep	Do not loop the tests
9. Press N then <—	1 sec	1 beep	Do not stop on error
<p>-Wait for up to 1 minute for test 0 to run. -Listen carefully for the audible response. If there is one long beep followed by one short beep, an error has occurred. If there are no beeps, an error has occurred. If there is one short beep only, the test ran without error. -Return to page 3-4400-28, step b.</p>			

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU17

Select the symptom that best matches your problem from those listed in this table (also continued on next page).

SYMPTOM	ACTION Install new FRU or go to page indicated
Multiple correct image	3-4400-32
Multiple image and white vertical stripes	3-4400-32
Multiple image on white background	3-4400-32
Additional horizontal or vertical lines on the test patterns	3-4400-33
Wrong color(s)	3-4400-36
Bad characters or no characters on A/N test areas of patterns F1 & F3 (see Chapter 2 for description of areas of test patterns)	3-4400-50
Only A/N test areas on patterns F1 & F3 (ignore background color)	3-4400-36
Pattern(s) correct except ALL characters are missing	UC
5378 Model C01 pattern F1 only displayed	Bit plane 0/1
Bad focus	3-4400-67
Pattern(s) correct except for blink	3-4400-49
Pattern(s) cut off at edge of screen	3-4400-71
Pattern(s) folded over at edge of screen	3-4400-71
Any other symptom	CVD or bit plane card

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU18

Action

- a. If the DAU is a 5378 model M01, go to page 3-4400-51.
If the DAU is a 5378 model C01,
-Power off the system unit, then the DAU.
-Unseat bit plane 0/1 card.
-Power on the DAU.
If no multiple image, install a new bit plane 0/1 card.
Else go to b.
- b. -Power off the DAU.
-Reseat bit plane 0/1 card.
-Unseat bit plane 2/3 card.
-Power on the DAU.
If no multiple image, install a new bit plane 2/3 card.
Else go to c.
- c. -Power off the DAU.
-Reseat bit plane 2/3 card.
-Unseat bit plane 4/5 card.
-Power on the DAU.
If no multiple image, install a new bit plane 4/5 card.
Else install a new SC card.

Action

- a. If the DAU is a 5378 model M01, go to page 3-4400-51.
Else go to b.
- b. -Power off the system unit, then the DAU.
-Unseat bit plane 0/1 card. (See the card plugging diagram on the DAU card cage.)
-Power on the DAU.
If the error lines do not appear on the test patterns, install a new bit plane 0/1 card.
Else go to c.
- c. -Power off the DAU.
-Reseat bit plane 0/1 card.
-Unseat bit plane 2/3 card.
-Power on the DAU.
If the error lines do not appear on the test patterns, install a new bit plane 2/3 card.
Else go to d.
- d. -Power off the DAU.
-Reseat bit plane 2/3 card.
-Unseat bit plane 4/5 card.
-Power on the DAU.
If the error lines do not appear on the test patterns, install a new bit plane 4/5 card.
Else install a new CVD card.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU20

Action

- a. If any progress messages were displayed when POST ran, go to c.
Else go to b.
- b. -Power off the system unit, then the 5378 DAU.
-Power on the DAU only.
-Wait for up to 1 minute for test pattern(s) to be displayed.
If the top of any pattern is cut off, go to page 3-4400-71.
Else go to c.
- c. -If the DAU is a model M01, go to page 3-4400-51.
-Power off the system unit, then the DAU.
-Swap bit plane 0/1 and bit plane 2/3 cards.
-Power on the DAU, then the system unit.
If the symptom is the same as the original problem, go to d.
If different symptom, bit plane card 0/1 OR 2/3 has failed.
Install a new bit plane card in the location that solves the problem.
- d. -Power off the system unit, then the DAU.
-Swap back bit plane 0/1 and 2/3 cards.
-Swap bit plane 2/3 and bit plane 4/5 cards.
-Power on the DAU, then the system unit.
If the symptom is the same as the original problem, go to e.
If different symptom, bit plane card 2/3 OR 4/5 has failed.
Install a new bit plane card in the location that solves the problem.

TABLE CONTINUES ON NEXT PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU20

Action

- e. -Swap back bit plane 2/3 and 4/5 cards.
 -If your problem is wrong background color go to step f.
 -If your problem is bad or no alphanumerics go to page 3-4400-50.
 -Power on the work station correctly.
 -Press the test switch on the right-hand side of the 5379 display.
 -Check for the following possible video cable failures by using the color of the test bars:

<u>Color of bars</u>	<u>Possible failure</u>	<u>Cables to swap</u>
Red	Open Red cable	3 & 5
Green	Open Green cable	4 & 5
Blue	Open Blue cable	5 & 3
Cyan/Turquoise	Grounded Red cable	3 & 5
Mauve	Grounded Green cable	4 & 5
Yellow	Grounded Blue cable	5 & 3

(None of these: go to step f.)

- Check by swapping cable connectors in the above list at both the DAU and display ends of the cable. See Chapter 5, pages 5-42 and 5-118.
 -If the symptom changes, suspect that the cable has failed. Repair if possible, or install a new cable.
 -If the same symptom recurs, swap back the cables and go to f.
- f. -Power off the system unit, then the DAU. Install a new CVD card, then, if necessary, a new SC card in the DAU.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU21

Action

- a. -Check that the video cables (3), (4), and (5) are correctly connected to sockets (3), (4), and (5) on the rear of the DAU.
(If 5379 is a Model M01, only J4 is used.)
If not correct, replug correctly.
Else go to b.
- b. If the DAU is a 5378 Model M01, go to page 3-4400-51.
If the DAU is a 5378 Model C01,
-Power off the system unit, then the DAU.
-Swap bit plane 0/1 and bit plane 2/3 cards.
-Power on the DAU.
If the symptom is the same as the original symptom, then go to c.
If different symptom, bit plane card 0/1 OR 2/3 has failed.
Install a new bit plane card in the location that solves the problem.
- c. -Power off the DAU.
-Swap back bit plane 0/1 and 2/3 cards if swapped in the previous step.
-Swap bit plane 2/3 and bit plane 4/5 cards.
-Power on the DAU.
If the symptom is the same as the original symptom, go to d.
If different symptom, bit plane card 2/3 OR 4/5 has failed.
Install a new bit plane card in the location that solves the problem.

TABLE CONTINUES ON NEXT PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU21

Action

- d. -Swap back bit plane 2/3 and 4/5 cards.
 -Press the test switch on the right-hand side of the 5379 display.
 -Check for the following possible video cable failures by using the color of the test bars:

<u>Color of bars</u>	<u>Possible failure</u>	<u>Cables to swap</u>
Red	Open Red cable	3 & 5
Green	Open Green cable	4 & 5
Blue	Open Blue cable	5 & 3
Cyan/Turquoise	Grounded Red cable	3 & 5
Mauve	Grounded Green cable	4 & 5
Yellow	Grounded Blue cable	5 & 3

(None of these: go to step e.)

- Check by swapping cable connectors in the above list at both DAU and display ends, see Chapter 5, pages 5-42 and 5-118.
 If symptom changes, suspect that the cable has failed. Repair if possible, or install a new cable.
 If the same symptom, swap back the cables and go to e.

- e. -Power off the DAU.
 Install a new CVD card, then, if necessary, a new SC card in the DAU.

Action

- a. -Power off the system unit, then the DAU.
-Disconnect the video cable from B1A3.
-Disconnect the flexi-cable from A1D2.
-Connect the power leads of the logic probe as follows:
 +5 V lead (red) B1A2-U03
 ground lead (black) B1A2-U08
-Power on the DAU.
-Probe the following test points on the interconnect card
 (see Figure 4-12 on page 4-13):
- TP1 (+10 MHz)
 TP2 (+20 MHz)
 TP4 (+16 MHz)
 TP5 (+5 MHz)
- NOTE: You must connect the probe tip directly to the logic probe - do not use an extension cable.
If they are all pulsing, install a new SC card, then, if necessary, a new UC card, then a new GP card.
If all are not pulsing, go to b.
- b. -Unseat all the cards, one at a time, EXCEPT for B1-A2 and probe the test points again to check for another card shorting the clock signal(s).
If a short is found, install a new card in place of the one that failed.
If no short is found, install a new CVD card.

Action

- a. -Observe the 4 power-supply LEDs (see location label on top of the power supply unit).
If they are all On, go to b.
Else go to page 3-4400-40.
- b. -Measure the voltage on the fan connector (see Chapter 4).
If inside the +12 V limits (+10.8 V to 13.2 V), install a new fan.
If outside limits, go to c.
- c. -Power off the system unit, then the DAU.
-Check for continuity through the interconnect card (see Figure 4-11 on page 4-12):

<u>Voltage</u>	<u>Source (P3)</u>	<u>Destination</u>
+12 V	pin 6	fan connector pin C
ground	pins 7,8,11,12	fan connector pin A

If continuity OK, install a new power supply unit.
Else install a new interconnect card.

Action

- a. -Observe the power-supply LEDs (see the location label on top of the power supply unit).

If all 4 are On, go to b.

If none are On, go to d.

If only some are On, go to j.

- b. -Measure the voltages at the logic boards:

<u>Voltage Pin</u>	<u>Ground Pin</u>	<u>Voltage</u>
A1-D2D03	A1-D2D08	4.8 V to 5.2 V
B1-A2D03	B1-A2D08	4.8 V to 5.2 V
B1-A2D06	B1-A2D08	-4.9 V to -5.5 V

If all the voltages are correct, go to page 3-4400-42.

Else go to c.

- c. -Check for continuity through the interconnect card, see Figure 4-12 on page 4-13.

<u>Voltage</u>	<u>Source</u>	<u>Destination</u>
+5 V	pins 1-4	A1A2-D03, J08, P03, U03
+5 V	pins 1-4	B1D2-D03, J08, P03, U03
-5.2 V	pin 10	B1D2-U06, U11

If continuity is OK, install a new power supply unit.

Else install a new interconnect card.

- d. -Check the supply voltage.
This can be checked by plugging a known working device into the supply outlet socket.
If voltage is not present, inform the customer.
Else go to e.

- e. -Disconnect 5378 DAU from the mainline power outlet.
-Check the DAU mainline power fuse.
If the fuse is good, go to f.
Else go to g.

- f. -Check the continuity of the mainline power cable.
If continuity is good, install a new power supply unit.
Else install a new mainline power cable.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU24

Action

- g. -Install a new fuse. Ensure it is the correct value and type of fuse.
 -Reconnect to the mainline power supply and power on for one minute.
 -Power off and disconnect from the mainline power supply.
 -Check the mainline fuse again.
 If the fuse is good, your problem is resolved.
 Else go to h.
- h. -Disconnect the 5379 mainline power cable from J2 on the rear of the DAU.
 -Install a new fuse. Ensure it is the correct value and type of fuse.
 -Reconnect to the mainline power supply and power on for one minute.
 -Power off and disconnect from the mainline power supply.
 -Check the mainline fuse again.
 If the fuse is good, go to i.
 Else install a new DAU power supply unit.
- i. -Check the 5379 mainline power cable for shorts.
 If a short is found, install a new cable.
 Else install a new primary power assembly in the 5379.
- j. -Unseat all the cards in sequence to determine if a card is shorting the supply.
 If a short is found, install a new card.
 Else go to k.
- k. -Check for no shorts on interconnect card, see Figure 4-12 on page 4-13.

<u>Voltage</u>	<u>Power Connector P3 Pin</u>
+5 V	1,2,3,4
+5 V sense	5
+12 V	6
-12 V	9
-5.2 V	10,13
return	7,8,11,12,14

If there are no shorts, install a new power supply unit.
 Else install a new interconnect card.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU25

Action

- a. -Power off the system unit, then the DAU.
-Disconnect the DAU-to-system-unit cable at the DAU end.
-Power on system unit.
If system unit POST still fails, install a new display/mouse/tablet adapter in the system unit.
If POST runs OK, go to b.
- b. -Power off the system unit.
Check the system-unit-to-DAU cable for continuity and no shorts (or try another system-unit-to-DAU cable, if available).
If non-continuity or shorts are found (or the fault was eliminated when you tried another cable) install a new cable.
Else go to c.
- c. -Power off the DAU.
-Check for continuity and no shorts on the bus receiver flexi-cable.
If cable is bad, install a new flexi-cable.
Else install a new DBR card.

Action

- a. -Power off the system unit, then the DAU.
-Disconnect the video cable from B1A3.
-Disconnect the bus receiver flexi-cable from A1D2.
-Connect the power leads of the logic probe as follows:
+5 V lead (red) B1A2 - U03
ground lead (black) B1A2 - U08
-Probe interconnect card TP3 (-POR).
-Power on the DAU.
The signal should be down for about 1 second, then go up and stay up.
If the signal is correct, go to page 3-4400-25.
Else go to b.
- b. -Check for continuity of the -POR line in interconnect card between power connector pin 15 and A1A2-S13.
If good, install a new power supply unit.
If bad, install a new interconnect card.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU27

Action

- a. -Power off the system unit, then the DAU.
-Disconnect the video cable from B1A3, in the 5379 DAU.
-Disconnect the bus receiver flexi-cable from A1D2.
-Review Figure 4-12 on page 4-13, and connect the power leads of the logic probe as follows:
 +5 V lead (red) B1A2 - U03
 ground lead (black) B1A2 - U08
-Probe TP3 (-POR) on the interconnect card.
-Power on the DAU.
The signal should be down for about 1 second, then go up and stay up.
If the signal is correct, reconnect the video and bus receiver cables, and go to page 3-4400-25.
Else go to b.
- b. -Power off the DAU and unseat each card one at a time.
-Power on while probing -POR each time you unseat a card.
If signal is now correct, install a new card in place of the last one unseated.
If signal still wrong, go to c.
- c. -Review Figure 4-11 on page 4-12, and check for continuity and no shorts to the -POR line in the interconnect card between power connector P3 pin 15 and A1A2-S13.
If good, install a new power supply unit.
Else install a new interconnect card.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU28

Action

- a. If the DAU is a Model C01, install a new CVD card in the DAU.
Else go to b.
- b. -Power off the system unit, then the DAU.
-Swap the video cables J4 and J6 at the DAU.
-Power on the DAU.
If moving lines appear on the display
go to c.
Else go to d.
- c. -Check for continuity and no shorts in the video cable between B1A2-A3 and the sockets on the rear panel of the DAU.

<u>Signal</u>	<u>Twin-Ax Connector</u>	<u>Board Pin</u>
Video +	J4 pin	B1-A3D10
Video -	J4 socket	B1-A3D11

If the cable is bad, repair if possible, or install a new cable.
Else install a new CVD card in the DAU.

- d. -Check for continuity and no shorts in the video cable to the display. Repair if possible, or install a new cable.
If good, install a new display video card in the 5379.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU29

Action

- a. -Power off the system unit, then the DAU.
 -Disconnect the video cable from B1A3.
 -Disconnect the flexi-cable from A1D2.
 -Connect the power leads of the logic probe as follows:
 +5 V lead (red) B1A2-U03
 ground lead (black) B1A2-U08
 -Power on the DAU.
 -Probe J6 socket (horiz. sync.) and J6 pin (vert. sync.) on the rear panel of the DAU. If they are both pulsing, go to d. Else go to b.

- b. -Disconnect the sync cable from J6.
 -Probe J6 socket and pin again.
 -If they are now both pulsing go to d.
 -Else go to c.

- c. -Check for continuity and no shorts in the video cable between B1A2-A3 and the sockets on the rear panel of the DAU:

<u>Signal</u>	<u>Twin-Ax Connector</u>	<u>Board Pin</u>
Vert. Sync.	J6 pin	B1-A3D12
Horiz. Sync.	J6 socket	B1-A3D13

If cable is bad, repair if possible, or install a new cable.

Else install a new SC.

- d. -Power off the DAU.
 -Swap the sync cable (6) with the green video cable (4) at both the DAU and display ends (see Chapter 4).
 -Power on the DAU.
 -Note the symptom, then power off and swap back the cables.
 If sync was good (ignore any color problem) then the sync cable has failed.
 NOTE: If the 5379 is a Model M01, the screen is blank if the cable has failed.
 Repair if possible, or install a new cable.
 If sync was bad, go to e.
- e. -Install a new deflection amplifier card in the display, then, if necessary, a new SC card in the DAU.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU30

Action

- a. -Power off the system unit, then the DAU.
-Disconnect the video cable from B1A3.
-Disconnect the flexi-cable from A2D4.
-Connect the power leads of the logic probe as follows:
+5 V lead (red) B1A2-U03
ground lead (black) B1A2-U08
-Power on the DAU, then the system unit.
-Probe the following test points on the interconnect card: (see Chapter 4)
TP1 (10 MHz) TP4 (16 MHz)
TP2 (20 MHz) TP5 (5 MHz)
NOTE: You must connect the probe tip directly to the logic probe - do not use an extension cable.
If they are all pulsing, go to b.
Else go to e.
- b. -Power off the DAU.
-Unseat the flexi-cable from A1D2.
-Power on the DAU.
-Probe the following pins:
A1D2-J12 (+16 MHz)
A1C2-B03 (+16 MHz)
A1C2-U07 (+68K clock)
If they are all pulsing, go to c.
Else go to d.
- c. -Power off the work station.
Disconnect the bus receiver flexi-cable from the A1 gate.
Check the bus receiver flexi-cable and the system unit-to-DAU cable for continuity and no shorts, see Chapter 4.
If continuity is bad, install a new flexi-cable or system unit-to-DAU cable.
-Else install a new DBR card, then, if necessary a new GP card.

TABLE CONTINUES ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU30

Action

- d. -Check for continuity and no shorts in the interconnect card flexi-cable.
If the cable is bad, install a new flexi-cable.
If the cable is good, install a new interconnect card, then, if necessary, a new board A.
- e. -Check for a card that is grounding the clock signal(s) by unseating each card in turn EXCEPT the CVD card, and probing the missing clock(s) again.
If the cause of the problem is found, install a new card in place of the one that failed.
If the cause is not found, install a new CVD card, then, if necessary, a new interconnect card.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU31

Action

- a. -Power off the system unit, then the DAU.
-Disconnect the flexi-cable from A2D4.
-Connect the power leads of the logic probe as follows:
 +5 V lead (red) B1A2-U03
 ground lead (black) B1A2-U08
-Power on the DAU, then the system unit.
-Probe B1-A2D07 (+ blinking VTL).
If pulsing, install a new CVD card.
If not pulsing, go to b.
- b. Install a new SC card, then, if necessary, a new CVD card in the DAU.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU32

Action

- a. -Power off the system unit, then the DAU.
-Swap bit plane 2/3 and bit plane 4/5 cards.
-Power on the DAU only.
-Wait for the test patterns to be displayed.
-Note whether characters are displayed in the alphanumeric test areas of pattern F1 (and pattern F3 if model C01). (See Chapter 2.)
-Power off the system unit and swap back the bit plane cards.
If there were bad or no characters on the A/N test areas of pattern F1 (and F3), install a new UC card.
If characters were present, install a new bit plane 2/3 card.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU33

Action

- a. -Power off the DAU.
-Unseat bit plane 2/3 and install it as bit plane 0/1.
-Unseat bit plane 4/5 (to be used later).
-Power on the DAU.
-Note whether an error symptom is displayed on test pattern F0.
-Power off the DAU, unseat the bit plane from position 0/1 and install the card previously unseated from position 4/5 into position 0/1.
-Power on the DAU.
-Note whether an error symptom is displayed on test pattern F0 with this card.
If the error is the same with either of the bit plane cards in position 0/1, go to b.
If no error symptom is displayed with either bit plane cards in position 0/1, go to b.
Else install a new bit plane card to replace the card that displays the error symptom.
- b. -Power off the DAU.
-Install a new CVD card, then a SC card.

5378 DISPLAY ATTACHMENT UNIT - TABLE DAU34

Undetermined Problems

You have gone through the 5378 DAU PIC without solving the problem. The following steps should aid you to find additional symptoms.

Action

- a. -Check that the power supply voltages at the logic boards are inside their limits:

<u>Voltage Pin</u>	<u>Ground Pin</u>	<u>Voltage (dc)</u>
A1-D2D03	A1-D2D08	4.8 V to 5.2 V
B1-A2D03	B1-A2D08	4.8 V to 5.2 V
B1-A2D06	B1-A2D08	-4.9 V to -5.5 V

- b. -Check the system for loose or damaged cables or connectors. (See Chapter 4 for cable wiring diagrams.)
- c. -Check that both fans are running with no obstructions to the air flow.
- d. -Select UTILITIES in the advanced diagnostics menu, start an error log, and select RUN TESTS MULTIPLE TIMES. This tests the machine thoroughly for a period of time to aid you to identify the failure symptom. When you have identified the symptom, go to page 3-2, "Start," or to the correct PIC for the symptom you received.

If you have gone through these procedures and still have a problem, request technical support.

5379 DISPLAY ENTRY

- a. -Observe the green LED on the right-hand side of the display.
-Remove the rear cover.
-Look for the following symptoms (see Chapter 4 for locations) and use the FIRST symptom that matches your problem:

Symptom	Go to Page:
Green LED Off	3-4400-55
One or both power-supply-card LEDs Off	3-4400-56
Deflection card LED Off	3-4400-57
Blank screen (no test pattern or raster)	3-4400-58
Test switch not working, raster OK	3-4400-63
Test switch not working, bright raster	3-4400-64
None of these	3-4400-54

5379 DISPLAY - TABLE DISO

- a. -Press the test switch and rotate the brightness control on the right-hand side of the display. Select the FIRST symptom that matches your problem.

Symptom	Go to Page:
Test bars and flyback (see Glossary)	3-4400-65
Test bars and bright raster	3-4400-66
Test bars with bad focus	3-4400-67
Problem with brightness control	3-4400-73
Test bars with bad color purity or brightness (5379 Model C01 only)	3-4400-68
Test bars wrong color (5379 Model C01 only)	3-4400-69
Test bars wrong size or folded over	3-4400-71
Test bars shifted	3-4400-71
Test bars distorted	3-4400-72
Test bars not stable (bad sync)	3-4400-46
Problem with manual degauss switch (5379 Model C01 only)	3-4400-74
Any other symptom	3-4400-75

5379 DISPLAY - TABLE DIS1
(The green LED is Off)

Action

- a. -Check that the 5379 mainline power cable is connected to the mains outlet J2 at the rear of the 5378 DAU.
-Check that the 5378 has power by verifying that the 5378 fans are running.
If the 5378 has power, go to b.
Else go to page 3-4400-8 (5378 entry table).
- b. -Power off the 5378.
-Disconnect the 5379 mainline power cable at both ends.
-Check the mainline power cable for continuity and no shorts.
If the cable is good, go to c.
Else install a new mainline power cable.
- c. -Power off the 5378.
-Wait 1 minute.
-Check for continuity between the mainline input and output connectors J1 and J2.
If continuity is good, go to d.
Else install a new power supply unit in the 5378.
- d. -Reconnect the 5379 mainline power cable at both ends.
-Power on the 5378.
-Observe the 2 status LEDs on the 5379 power supply card (see Figure 4-3 on page 4-5).
If they are both On, install a new manual controls card, then, if necessary, a new power supply card in the display.
If both LEDs are not On, go to e.
- e. Install new power supply card. If the machine still fails, LEAVE THE NEW POWER SUPPLY CARD INSTALLED and install a new primary power assembly.

5379 DISPLAY - TABLE DIS2
(Power Supply Card LED(s) are Off)

Action

- a. If there is only one LED Off, install a new power supply card.
If more than one LED is Off, go to b.
- b. -Power off the 5378 in the correct sequence (system unit first).
-Disconnect the 5379 mainline power cable from the rear of the 5378 DAU.
-Open the 5379 safety cover (review Chapter 5, "Removal, Installation, and Adjustment Procedures") and disconnect all the output connectors (including the fan connector if installed) from the power supply card.
Do not disconnect the EHT lead.
-Close and fasten the safety cover and reconnect the 5379 to the mainline power supply.
If the LEDs are still Off, install a new power supply card, then, if necessary, a new primary power assembly.
If the LEDs are On, go to c.
- c. -By reconnecting each output connector in sequence, determine which card or connector is shorting the output from the power supply card.
Install a new card in place of the one that failed.

5379 DISPLAY - TABLE DIS3
(Deflection Card LED is Off)

Action

- a. -Measure the voltages at test points TP1, TP3, and TP4 on the power supply card, see Figure 4-3 on page 4-5.
- | | |
|-----|---------------------------------|
| TP1 | +4.8 V dc to +5.5 V dc to frame |
| TP3 | -4.8 V dc to -5.5 V dc to frame |
| TP4 | +4.8 V dc to +5.5 V dc to frame |
- If any voltage is not correct, go to d.
If all voltages are correct, go to b.
- b. -Power off the 5378.
-Open the 5379 safety cover.
-Check continuity of the power cables between power supply card Xi and deflection card Xm. See Chapter 5, page 5-29 and 5-53.
If the continuity is bad, repair if possible or install a new cable.
Else go to c.
- c. -Install a new deflection amplifier card, then, if necessary, a new CRT base card, then a new CRT.
- d. -Power off the 5378.
-Disconnect the 5379 mainline power cable from the outlet at the rear of the 5378 DAU.
-Open the 5379 safety cover (see Chapter 5, "Removal, Installation, and Adjustment Procedures") and disconnect all the output connectors (including the fan connector if installed) from the power supply card. Do not disconnect the EHT lead.
-Close and fasten the safety cover and reconnect the 5379 to the mainline power supply.
-Measure the voltages on TP1, TP3, and TP4 again.
If any voltage is still wrong, install a new power supply card.
If all voltages are correct, go to e.
- e. -By reconnecting each output connector in sequence, determine which card is shorting the output from the power supply card.
Install a new card in place of the one that failed.

5379 DISPLAY - TABLE DIS4
(Blank Screen, No Test Pattern or Raster)

Action

- a. -Power off the system unit, then the 5378 DAU.
Note. This step checks the CRT heater, it may be possible to also see if the heater (filament) is glowing. If it is glowing go to DIS6 on page 3-4400-60.
-View the Power Supply LED adjacent to TP4.
-If the LED does not remain on for five seconds after power off, go to DIS6 on 3-4400-60.
Else go to b.
- b. -Power off the system unit, then the 5378 DAU.
-Open the 5379 safety cover (review Chapter 5, "Removal, Installation, and Adjustment Procedures").
-Check for continuity and no shorts in the heater connector between power supply card Xg and CRT base card Xh. See pages 5-29 and 5-62.
If continuity is bad, repair if possible, or install a new FRU.
Else go to c.
- c. Install a new CRT base card, then, if necessary, a new CRT.

5379-C01 DISPLAY - TABLE DIS5
(Fan is Stopped or Slow)

Action

- a. -Observe the green LED on the right-hand side of the display.
If the green LED is off, go to DIS1 on page 3-4400-55.
Else go to b.
- b. -Measure the voltage on power supply card test point TP4.
If voltage is between +4.8 V and +5.5 V dc install a new fan.
If voltage is outside these limits, install a new power supply card, then if necessary a new primary power supply assembly.

5379 DISPLAY - TABLE DIS6
(Blank Screen)

Action

- a. -If the display is a Model M01, go to b.
-Power off the system unit, then the 5378 DAU.
-Open the 5379 safety cover (review Chapter 5, "Removal, Installation, and Adjustment Procedures").
-Remove the connector Xg from the power supply card (see Chapter 5, page 5-29).
-Close and fasten the safety cover.
-Power on the 5378 DAU.
- b. -Measure the voltage on CRT base card TP5, see Chapter 4, Figure 4-5 on page 4-6 or Figure 4-6 on page 4-7:
TP5 +27 V to +35 V dc to frame
If voltage is wrong, install a new power supply card, then, if necessary, a new EHT cable, then a new CRT base card.
If voltage is correct, go to c.
- c. -Power off the 5378 DAU.
-Open the 5379 safety cover (review Chapter 5, "Removal, Installation, and Adjustment Procedures").
-Reconnect connector Xg to the power supply card if removed.
-Close and fasten the safety cover.
-Power on the 5378 DAU.
-Measure the voltage on CRT base card TP7, see Chapter 4, Figure 4-5 on page 4-6 or Figure 4-6 on page 4-7:
TP7 (Model M01) +10 V to -15 V dc to frame
TP7 (Model C01) -50 V to -110 V dc to frame
If the voltage is correct, install a new CRT base card, then, if necessary, a new video amplifier card, and then a new CRT.
If voltage is wrong, go to d.
- d. -Measure the voltages at test points TP1, TP2, TP3, and TP4 on the power supply card, see Chapter 4, Figure 4-4 on page 4-5:
- | | |
|-----|------------------------------|
| TP1 | +4.8 V to +5.5 V dc to frame |
| TP2 | +4.8 V to +5.5 V dc to frame |
| TP3 | -4.8 V to -5.5 V dc to frame |
| TP4 | +4.8 V to +5.5 V dc to frame |
- If any voltage is not correct, go to j.
If all voltages are correct, go to e.

TABLE CONTINUES ON NEXT PAGE

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5379 DISPLAY - TABLE DIS6
(Blank Screen)

Action

- e. -Check the continuity of the power cable between the power supply connector Xd and the video amplifier connector Xb.
If continuity is bad, repair if possible or install a new cable.
Else go to f.
- f. -Check the continuity of the cables between the video amplifier card connector Xn and the deflection card connector Xo.
If continuity is bad, repair if possible or install a new cable.
Else go to g.
- g. -Disconnect the brightness control connector from the video amplifier card connector Xa.
-Measure the resistance across pins 3 & 4 and across pins 4 & 5 of the connector while rotating the brightness control.
They should both vary from about:

 - (Model M01) 0 to 10 kilohms
 - (Model C01) 0 to 50 kilohms
If resistance is correct, go to i.
Else go to h.
- h. -Check for continuity and no shorts over the connector between the manual controls card and the video amplifier card connector Xa.
If good, install new manual controls card.
Else repair if possible or install new cable.
- i. -Check continuity of the G1 connector between video amplifier card and the CRT Base card.
If continuity is bad, repair if possible or install a new cable.
If good, install a new video amplifier card, then, if necessary, a new CRT base card, then a new deflection amplifier card, then a new CRT.

TABLE CONTINUES ON NEXT PAGE

5379 DISPLAY - TABLE DIS6
(Blank Screen)

Action

- j. -Power off the 5378.
-Disconnect the 5379 mainline power cable from the outlet at the rear of the 5378 DAU.
-Open the 5379 safety cover (review Chapter 5, "Removal, Installation, and Adjustment Procedures") and disconnect all the output connectors (including the fan connector if installed) from the power supply card.
Do not disconnect the EHT lead.
-Close and fasten safety cover and reconnect mainline power cable.
-Measure the voltages on TP1 through TP4 again. If voltage is still bad, install a new power supply card.
Else go to k.
- k. -By reconnecting each output connector in sequence, determine which card is shorting the output from the power supply card.
Install a new card in place of the one that failed.

5379 DISPLAY - TABLE DIS7
(No Test Bars, Raster is OK)

Action

- a. -Power off the 5378.
-Disconnect the 5379 mainline power cable from the outlet at the rear of the 5378 DAU.
-Open the 5379 safety cover (review Chapter 5, "Removal, Installation, and Adjustment Procedures").
-Disconnect the test switch connector Xa from the video amplifier card. (See Chapter 5, page 5-41.)
-Measure the resistance across pins 1 and 2 of the connector while pressing the test switch.
It should be short circuit when the switch is pressed and open circuit when not.
If good, go to c.
Else go to b.
- b. -Check for continuity of the cables between the manual controls card and video amplifier card connector Xa.
If continuity is bad, repair if possible or install a new cable.
Else install a new manual controls card.
- c. -Check for continuity of the connectors between deflection card connector Xo and video amplifier card connector Xn.
If continuity is bad, repair if possible or install a new cable.
Else go to d.
- d. -Install new video amplifier card, then, if necessary, deflection amplifier card, then a new CRT base card.

5379 DISPLAY - TABLE DIS8
(No Test Bars, Bright Raster)

Action

- a. -Measure the voltages at test points TP1, TP2, TP3, and TP4 on the power supply card:
- | | |
|-----|---------------------------------|
| TP1 | +4.8 V dc to +5.5 V dc to frame |
| TP2 | +4.8 V dc to +5.5 V dc to frame |
| TP3 | -4.8 V dc to -5.5 V dc to frame |
| TP4 | +4.8 V dc to +5.5 V dc to frame |
- If any not correct, go to d.
Else go to b.
- b. -Check for continuity of the power cable between video amplifier card Xb and power supply card Xd. See Chapter 5, page 5-41. If continuity is bad, repair if possible or install a new cable.
Else go to c.
- c. -Install a new video amplifier card.
- d. -Power off the 5378.
-Disconnect the 5379 mainline power cable from the outlet at the rear of the 5378 DAU.
-Open the 5379 safety cover (review Chapter 5, "Removal, Installation, and Adjustment Procedures") and disconnect all the output connectors (including the fan connector if installed) from the power supply card.
Do not disconnect the EHT lead.
-Close and fasten safety cover and reconnect mainline power cable.
-Measure the voltages on TP1, TP2, TP3, and TP4 again.
If any voltage is still bad, install a new power supply card.
Else go to e.
- e. -By reconnecting each output connector in sequence, determine which card is shorting the output from the power supply card. Install a new card in place of the one that failed.

5379 DISPLAY - TABLE DIS9
(Test Bars and Flyback)

Action

- a. -Measure the voltages at test points TP1, TP2, TP3, and TP4 on the power supply card:

TP1	+4.8 V dc to +5.5 V dc to frame
TP2	+4.8 V dc to +5.5 V dc to frame
TP3	-4.8 V dc to -5.5 V dc to frame
TP4	+4.8 V dc to +5.5 V dc to frame

If any voltage is not correct, go to d.
Else go to b.

- b. -Check for continuity of the cable between deflection amplifier card connector X0 and video amplifier card connector Xn.

If continuity is bad, repair if possible or install a new cable.
Else go to c.

- c. -Install a new video amplifier card, then, if necessary, a new deflection card.

- d. -Power off the 5378.

-Disconnect the 5379 mainline power cable from the outlet at the rear of the 5378 DAU. Remove the 5379 safety cover (review Chapter "Removal, Installation, and Adjustment Procedures") and disconnect all the output connectors (including the fan connector if installed) from the power supply card.

Do not disconnect the EHT lead.

-Close and fasten safety cover and reconnect mainline power cable.

-Measure the voltages on TP1, TP2, TP3, and TP4 again.

If any voltage is still bad, install a new power supply card.

Else go to e.

- e. -By reconnecting each output connector in sequence, determine which card is shorting the output from the power supply card. Install a new card in place of the one that failed.

5379 DISPLAY - TABLE DIS10
(Test Bars and Bright Raster)

Action

- a. -Measure the voltage at power supply card TP3
TP3 -4.8 V to -5.5 V dc to frame
If the voltage is not correct, go to e.
Else go to b.
- b. -Measure the voltage on CRT base card TP7:
TP7 (Model M01) +10 V to -15 V dc to frame
TP7 (Model C01) -50 V to -110 V dc to frame
If the voltage is correct, install a new CRT.
Else go to c.
- c. -Check continuity of power cable between
power supply card connector Xd and video
amplifier card Xb.
If continuity is bad, repair if possible or
install a new cable.
Else go to d.
- d. -Check continuity of the G1 cable between
the video amplifier card and the CRT base
card.
If continuity is bad, repair if possible or
install a new cable.
Else install a new video amplifier card
then, if necessary, a new CRT base card
a new CRT.
- e. -Power off the 5378.
-Disconnect the 5379 mainline power cable
from the outlet at the rear of the 5378 DAU.
-Open the 5379 safety cover (review Chapter
5, "Removal, Installation, and Adjustment
Procedures") and disconnect all the
output connectors (including the fan
connector if installed) from the power
supply card.
Do not disconnect the EHT cable.
-Close and fasten safety cover and reconnect
mainline power cable.
-Measure the voltage on TP3 again.
If any voltage is still bad, install a new
power supply card.
Else go to f.
- f. -By reconnecting each output connector in
sequence, determine which card is shorting
the output from the power supply card.
Install a new card in place of the one that
failed.

5379 DISPLAY - TABLE DIS11
(Test Bars with Bad Focus)

Action

- a. -If the 5379 is a Model M01 go to b.
-Perform the focus adjustment (see Chapter 5, page 5-43).
If you are not able to resolve the problem, install a new CRT base card, then, if necessary, a new CRT assembly, see Chapter 5.
- b. -Perform the focus adjustment (see page 5-48).
If you are not able to resolve the problem, remove connector (B) to the video card. Recheck the focus using test pattern Fd. If the focus is good over part of the display, go to c.
Else install a new CRT base card, then if necessary, a new CRT assembly, see Chapter 5.
- c. Install a new video card, then deflection card.

5379-CO1 DISPLAY - TABLE DIS12
(Test Bars with Bad Purity or Brightness)

Action

- a. -Press and hold the test switch.
-Press the manual degauss switch.
If the screen image does not waver go to c.
Else go to b.
- b. -Power off the 5378.
-Remove the 5379 rear and top safety covers.
-Swap the two degauss coil connectors.
-Replace the rear and top safety covers.
-Power on the 5378.
-Display the test pattern F4.
If the colors are not correct, install a new CRT, see Chapter 5.
- c. -Measure the resistance of each coil of the degauss coil assembly. If both coils are approximately 32 ohms, go to page 3-4400-74. Else install a new degauss coil assembly.

5379-C01 DISPLAY - TABLE DIS13
(Test Bars Colored)

Action

- a. -Reconnect the video cables.
-Rotate the brightness control on the right-hand side of the display.
If the foreground and background brightness varies as the control is rotated, go to b.
Else go to page 3-4400-73.
- b. -Perform the color balance adjustments (see Chapter 5, page 5-89).
If you are not able to resolve the problem, go to c.
- c. -Check for the following possible video cable failures by using the color of the bars:
Press TEST to display the test bars.

<u>Color of bars</u>	<u>Possible failure</u>	<u>Cables to swap</u>
Red	Open Red cable	3 & 5
Green	Open Green cable	4 & 5
Blue	Open Blue cable	5 & 3
Cyan/Turquoise	Grounded Red cable	3 & 5
Mauve	Grounded Green cable	4 & 5
Yellow	Grounded Blue cable	5 & 3

(None of these: go to step d.)

- Check by swapping cable connectors in the list above at both DAU and display ends.
See Chapter 5 pages 5-42 and 5-118.
If symptom changes, the suspect cable has failed. Repair or install a new cable.
Else swap back cables and go to d.

TABLE CONTINUES ON NEXT PAGE

TABLE CONTINUED FROM PREVIOUS PAGE

5379-C01 DISPLAY - TABLE DIS13
(Test Bars Colored)

Action

- d. -Swap the output connectors of the video amplifier card guided by the color of the bars (see Chapter 5, page 5-41.)

<u>Color of Bars</u>	<u>Outputs to Swap</u>
Cyan/Turquoise	red and blue
Mauve	green and blue
Yellow	red and blue

(none of these: go to step e).

(Note that the green output is a gray wire.)
If the symptom changes, install a new video amplifier card.

Else install a new CRT base card, then, if necessary, a new CRT assembly.

- e. Install a new video amplifier card, then, if necessary, a new CRT base card, then a new CRT assembly.

5379 DISPLAY - TABLE DIS14
(Test Bars Shifted or Wrong Size)

Action

- a. -Perform the horizontal and vertical shift and amplitude adjustments (see Chapter 5). If you are not able to solve the problem, install a new deflection amplifier card.

5379 DISPLAY - TABLE DIS15
(Test Bars Distorted)

Action

- a. -Perform the E+W adjustment (see Chapter 5).
If you are not able to solve the problem,
install a new deflection amplifier card.

5379 DISPLAY - TABLE DIS16
(Brightness Control Problem)

Action

- a. -Power off the 5378.
-Disconnect the 5379 mainline power cable from the outlet at the rear of the 5378 DAU.
-Open the 5379 safety cover (see Chapter 5, "Removal, Installation, and Adjustment Procedures").
-Disconnect the brightness control connector from the video amplifier card Xa.
-Measure the resistance across pins 3 & 4 and across pins 4 & 5 of the connector while rotating the brightness control. They should both vary from between approximately:
- (Model M01) 0 and 10 kilohms
(Model C01) 0 and 50 kilohms
- If variance is correct, install a new video amplifier card.
Else go to b.
- b. -Check for continuity and no shorts over the connector between the manual controls card and video amplifier card connector Xa. If the cable is good, install a new manual controls card.
If cable is bad, repair if possible or install a new cable.

5379 DISPLAY - TABLE DIS17
(Manual Degauss Problem)

Action

- a. -Power off the 5378.
-Disconnect the 5379 mainline power cable from the outlet at the rear of the 5378 DAU.
-Open the safety cover.
-Disconnect manual degauss connector from primary power assembly connector Xq.
-Measure the resistance across the connector while pressing the manual degauss switch. It should be short circuit when the switch is pressed and open circuit when not.
If correct, go to c.
Else go to b.
- b. -Check for continuity and no shorts over the connector between the manual controls card Xq and primary power assembly Xq.
If the cable is bad, repair if possible or install a new cable.
Else install a new manual controls card.
- c. -Measure the resistance of both coils of the degauss coil assembly. If the resistance of both coils measures approximately 32 ohms, go to d.
Else install a new degauss coil assembly.
- d. -Check the continuity of the cables between the primary power assembly and the degauss coils.
If continuity is bad, repair if possible or install a new cable.
Else install a new primary power assembly.

Undetermined Problems

You have gone through the 5379 PICs without solving the problem. The following steps should aid you to find additional symptoms.

Action

- a. -Check that the power supply voltages at the power supply card test points are inside their limits:
- | | |
|-----|------------------------------|
| TP1 | +4.8 V to +5.5 V dc to frame |
| TP2 | +4.8 V to +5.5 V dc to frame |
| TP3 | -4.8 V to -5.5 V dc to frame |
| TP4 | +4.8 V to +5.5 V dc to frame |
- b. -Check the system for loose or damaged cables or connectors. (See Chapter 4 for cable wiring diagrams.)
- c. -Check the screen brightness.
If the screen brightness is intermittent.
-Power off the workstation in the correct sequence.
-Remove the display covers.
-Check all connectors and ground points.
-If necessary replace the CRT base card.
- d. -Check that the fan is running with no obstructions to the air flow.
- e. -Select UTILITIES in the advanced diagnostics menu, start an error log, and select RUN TESTS MULTIPLE TIMES. This operates the machine thoroughly for a period of time to aid you to identify the failure symptom. When you have identified the symptom, go to page 3-2, "Start," or to the correct PIC for the symptom you received.

If you have gone through these procedures and still have a problem, request technical support.

Display/Mouse/Tablet Adapter Test

If necessary, load your advanced diagnostics diskette.

Press PF1, if instructed on the screen. Select the Graphics Display/Mouse/Tablet adapter Test 44 in menu 5. (See Chapter 2, for details of how to select menu 5.)

Now select Test 7. (DISPLAY/MOUSE/TABLET ADAPTER.)

DOES A 44XX (XXXX) ERROR CODE APPEAR?

YES Go to page 3-4400-93.

NO Go to the next page.

If the diagnostics do not recognize that a mouse or tablet is connected, the following message appears.

Neither **MOUSE** nor **TABLET** attached
Is this correct? (Y/N) _

DOES THE ABOVE MESSAGE APPEAR?

NO Go to page 3-4400-79.

YES Press Y or N, then ←, and go to the next page.

IS ERROR CODE 4410 (6335) DISPLAYED?

NO Go to page 3-4400-97.

YES Go to page 3-4400-93.

Messages similar to one of these appear at the top of the screen:



Tablet + Stylus attached.

Tablet + 4 Button Cursor attached.

MOUSE attached
Calibrate MOUSE (move it in a large circle)

CONTINUE ON THE NEXT PAGE

IS THE DEVICE A MOUSE?

YES Go to page 3-4400-89.

NO Go to the next page.

Tablet Test

You have a tablet attached. A message similar to one of the three following messages appears at the top of the screen:

Tablet + Stylus attached

Tablet + 4 Button Cursor attached

Tablet. No Stylus or Cursor

CONTINUE ON THE NEXT PAGE

If the screen that appears contains a message similar to the last one shown on the previous page, then it will be followed by a screen that contains a message similar to that shown below:

XX:XX:XX
ERROR -
GRAPHICS DISPLAY/ATTACHMENT UNIT AND
DISPLAY/MOUSE/TABLET ADAPTER 4400

4410 (8XXX)

XXXXXX XXXX

PRESS "ENTER" TO CONTINUE

? _

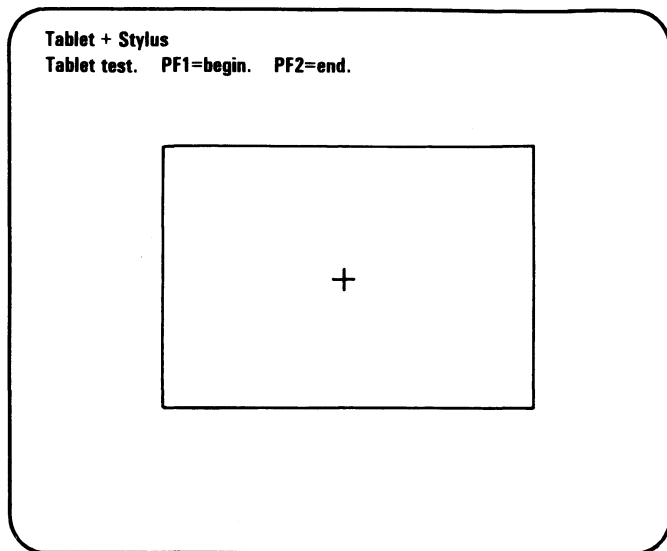
**IS THE DESCRIPTION OF YOUR TABLET AND
ATTACHED STYLUS/CURSOR CORRECT?**

YES Go to page 3-4400-83.

NO Reseat the stylus/cursor 9-pin connector to the tablet.
Set the power switch of the system unit to Off, wait 5 seconds, then set the switch to On and start the test again.
If the description is still wrong, review page 3-4400-93.

CONTINUE ON THE NEXT PAGE

The screen should now be similar to either the diagram below or to the one shown on the next page. In both diagrams the rectangle represents the tablet.



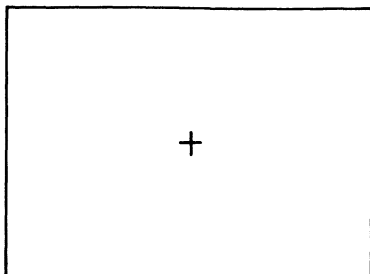
**HAVE YOU GOT A STYLUS ATTACHED TO YOUR
TABLET?**

YES Go to page 3-4400-86.

NO Go to the next page.

Tablet + 4 Button Cursor

Tablet test. PF1=begin. PF2=end.



**HAVE YOU GOT A 4-BUTTON CURSOR ATTACHED
TO YOUR TABLET?**

NO Go to page 3-4400-86.

YES Go to the next page.

Press PF1 to start, then press each of the four buttons. A number 1, 2, 3, or 4 should appear in the top-left corner of the screen each time a button is pressed, and disappear when the button is released.

**DOES EACH NUMBER APPEAR WHEN THE
CORRESPONDING BUTTON IS PRESSED AND
DISAPPEAR WHEN THE BUTTON IS RELEASED?**

NO Install a new 4-button cursor, and then, if necessary, a new tablet.

YES Go to page 3-4400-87.

Press PF1 to start, then press the stylus tip-switch against the tablet.

A number 1 should appear in the top-left corner of the screen and disappear when the tip-switch is released.

DOES THIS HAPPEN?

NO Install a new stylus, and then, if necessary, a new tablet.

YES Go to the next page.

DOES ERROR CODE 4410 (6333) APPEAR?

YES Go to page 3-4400-93.

NO Go to the next page.

Slowly move the stylus or 4-button cursor on the tablet.

DOES THE CROSS-HAIR ON THE SCREEN FOLLOW THE MOVEMENT?

NO Install a new stylus or 4-button cursor then, if necessary, a new tablet. See Chapter 5, page 5-1.

YES Verify that all areas of the tablet are working correctly. You should be able to move the cross-hair on the screen to within 6 mm (1/4 in.) of the edge of the rectangle.
Press PF2 to leave the test.
If any 4410 (6XXX) error code appears, go to page 3-4400-93. If you still have a problem, go to page 3-4400-97.

Mouse Test

Calibrate the mouse by moving it in a large circle on its pad until the screen message "Calibrate mouse" disappears.

DOES ERROR CODE 4410 (6332) APPEAR?

YES 4410 (6332) appears if you take longer than 30 seconds to calibrate the mouse, or if calibration fails.

Start the test again, and when prompted to calibrate the mouse, turn the mouse over. A red light should be visible. It may be pulsing quickly. If necessary, carefully brush or blow away any dust or fluff that may have collected in the two holes in the underside of the mouse.

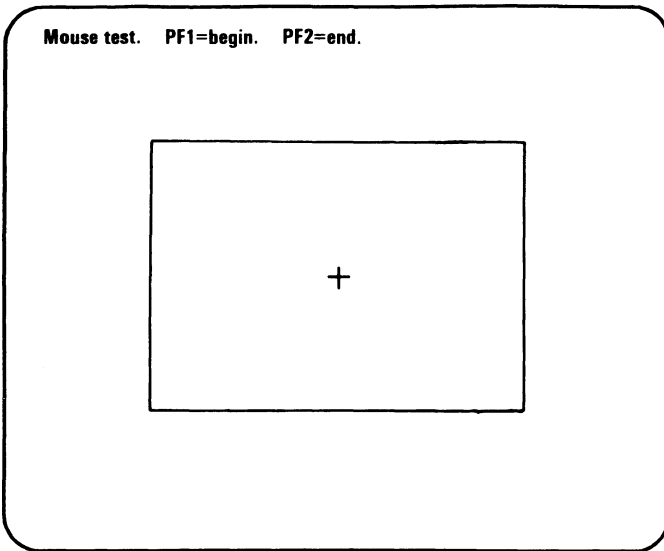
Set the power switch of the system unit to Off, wait for 5 seconds, then set the switch to On and start the test again.

Go to page 3-4400-93.

NO Go to the next page.

The screen should now be similar to the diagram below.
The rectangle represents the mouse pad.

Press PF1, then press each of the 3 switches on the mouse.
The letters L (left), C (center), and R (right) should appear
in the top-left corner of the screen. Each letter remains
until its switch is released.



DO ALL THREE SWITCHES OPERATE CORRECTLY?

NO Install a new mouse. See Chapter 5, page 5-1.

YES Go to the next page.

Slowly move the mouse on its pad.

**DOES THE CROSS-HAIR ON THE SCREEN FOLLOW
THE MOVEMENT OF THE MOUSE ON ITS PAD?**

NO Install a new mouse. See Chapter 5, page 5-1.

YES Go to the next page.

You should be able to move the cross-hair on the screen to the edge of the rectangle. To do this you may have to lift the mouse off the pad and place it in a position that permits it enough movement to cause the cross-hair to reach the edge of the rectangle.

Press PF2 to end the test.

If any 4410 (6XXX) error code appears, go to page 3-4400-93.

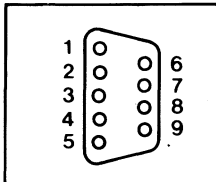
If you still have a problem, go to page 3-4400-97.

4410 (XXXX) Error Codes

- If you have received a 4410 (6XXX) error code, and you **DO** have a mouse or tablet installed, follow the instructions on this page.
 - For a 4410 (6XXX) code when you **DO NOT** have a mouse or tablet installed, and also for all other 4410 (XXXX) error codes go directly to the table on page 3-4400-96.
1. Power off the system unit.
 2. Check the mouse/tablet internal cable for continuity. See the figure on the next page.

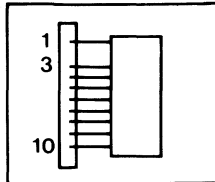
CONTINUE ON THE NEXT PAGE

From rear of
System Unit to
Mouse/Tablet



1	-12 V
2	0 V
3	+5 V
4	
5	
6	-10 to -8 V
7	0 V
8	0 to +1.0 V
9	+12 V

From Graphics Display Attachment
and Display/Mouse/Tablet Adapter
to Display/Mouse/Tablet Internal
Cable



10	-12 V
5	0 V
7	+5 V
4	-10 to -8 V
6	0 V
9	0 to +1.0 V
8	+12 V

IS THE CABLE CONTINUITY GOOD?

NO Install a new mouse/tablet internal cable. See Chapter 5, page 5-1.

YES Power on the system unit. Go to the next page.

Measure the voltages at the mouse/tablet connector on the display/mouse/tablet adapter (see the figure below).

ARE THE VOLTAGES OK?

- NO** Install a new display/mouse/tablet adapter card (see Chapter 5, page 5-1).
- YES** Go to the 4410 (XXXX) Error Code Table on the next page.

4410 (XXXX) Error Code Table

The naming of a FRU in the table means you should install a new FRU. If the 1st action does not resolve the problem, perform the 2nd and 3rd actions as appropriate.

Error Code	1st Action	2nd Action	3rd Action
4410 (0XXX) 4410 (7XXX)	Display/mouse/ tablet adapter	-	-
4410 (6333)	Stylus/ Cursor	Tablet	Display/ mouse/tablet adapter
4410 (6XXX)	Mouse/ Tablet	Display/ mouse/ tablet adapter	-

CONTINUE ON THE NEXT PAGE

Even-Megabyte-Aligned (EMA) Extended Memory Test (5373) System Units Only

Notes:

1. *EMA extended memory is not available on IBM Personal Computer AT system units (5170).*
2. *Even-Megabyte-Aligned (EMA) Extended Memory is used with GCP Versions 3.1 and 3.2.*
3. *The memory in the system unit is in two parts:*
 - *Base memory*
 - *Expansion memory.*

Base memory consists of 512K bytes (K equals 1024) of memory modules on the system board, and possibly a 128KB Memory Expansion option.

Expansion memory consists of one or more memory expansion options. These memory expansion options may be arranged in one of two ways:

- a. Contiguous memory starting at address 1M (M equals 1,048,576).*
- b. Even-Megabyte-Aligned (EMA) extended memory in the address ranges of 12–13M and 14–15M.*

EMA memory is not tested during POST nor by the 200 memory diagnostics test. Therefore, a special test is made of EMA extended memory as part of test 4400. If you do not know whether EMA extended memory is installed in your system, see Chapter 6, "System Setup, Jumpers, and Switch Settings" on page 6-1, before continuing.

If there are no EMA Extended Memory adapters in the system unit and you still have a problem, go to page 3-4400-106.

If necessary, load your diagnostic diskette.

Press **PF1** if instructed (on the screen). Select the Graphics Display/Tablet/Mouse Test 44 in Menu 5. (See Chapter 2, for details of how to select Menu 5.)

Now select Test 8 (EMA Extended Memory Test).

XXXXKB of EMA Extended Memory Detected

Is this correct? (Y/N)

This test may take up to three minutes

Please stand by

-

IS THE MESSAGE CORRECT?

YES Press **Y** and go to page 3-4400-101.

NO Press **N** and go to the next page.
(Error message 4410 (8001) appears).

Power off the work station in the correct sequence, see Chapter 1, 1-17.

Unplug all the 512K-byte EMA extended memory adapters from your system unit.

Check the switch settings on each adapter and reseal it in the system unit.

Repeat the diagnostic test.

XXXXKB of EMA Extended Memory Detected

Is this correct? (Y/N)

**This test may take up to three minutes
Please stand by**

-

IS THE MESSAGE NOW CORRECT?

YES Press **Y** and go to page 3-4400-101.

NO Press **N** and go the next page.
(Error message 4410 (8001) appears).

Power off the work station in the correct sequence, see Chapter 1, 1-17.

Unplug all the 512K-byte EMA extended memory adapters from your system unit.

Set the switches on all adapters as for extended memory adapter 1. See table on page 3-4400-102.

Reseat the cards one at a time and repeat the diagnostic test.

The diagnostic message should be "0512K-byte of EMA Extended Memory Detected" each time the test is run successfully with a single extended memory card installed.

DID YOU IDENTIFY A FAILING ADAPTER?

- YES** Install a new EMA extended memory adapter in place of the failing adapter.
Check all the EMA extended memory adapters for correct switch settings.
- NO** Install a new system board.
Check all the EMA extended memory adapters for correct switch settings.

You may receive an error message similar to the one in the example below. If you do, make a note of the 10-character error code (in the position indicated by the arrowed example).

XX:XX:XX
ERROR -
GRAPHICS DISPLAY/ATTACHMENT UNIT AND
DISPLAY/MOUSE/TABLET ADAPTER 4400

4410 (8XXX)

XXXXXX XXXX

PRESS "ENTER" TO CONTINUE

? _

DID YOU RECEIVE AN ERROR MESSAGE SIMILAR TO THE ONE ABOVE?

NO Go to page 3-4400-106

YES Go to the next page.

When a memory error message is displayed, the failing address is in the form of a 10-character alphanumeric code.

Review the figure below and find the first two characters of your error code (make a note of the failing bank, 0 or 1).

Compare the switch settings shown for those characters with those of all 512K-byte extended memory adapters in your system. The failing adapter is the one with switch settings that match those in the figure below.

First two characters of error code	EMA Extended Memory Adapter	Bank	EMA Extended Memory switch settings							
			1	2	3	4	5	6	7	8
E8, E9, EA, EB EC, ED, EE, EF	1	0	off	off	off	on	off	on	on	on
		1	off	off	off	on	off	off	on	off
E0, E1, E2, E3 E4, E5, E6, E7	2	0	off	off	off	on	on	on	on	on
		1	off	off	off	on	on	off	on	off
C8, C9, CA, CB CC, CD, CE, CF	3	0	off	off	on	on	off	on	on	on
		1	off	off	on	on	off	off	on	off
C0, C1, C2, C3 C4, C5, C6, C7	4	0	off	off	on	on	on	on	on	on
		1	off	off	on	on	on	off	on	off

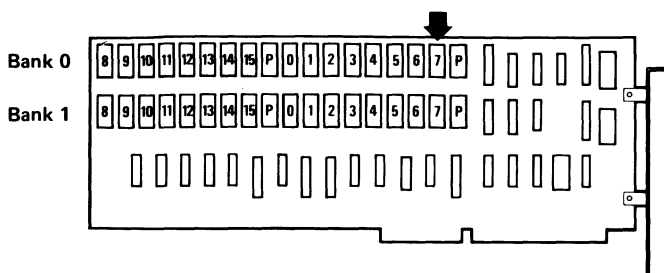
DOES YOUR SYSTEM HAVE A 512K-BYTE EMA EXPANSION ADAPTER WITH SWITCH SETTINGS THAT MATCH THOSE ABOVE?

NO Go to Section 6 and compare your switch settings with those in the switch-setting figures. Make the necessary corrections, then go to page 3-4400-97 and repeat the diagnostic tests.

YES Go to the next page.

The first two characters of your error code indicate which bank has the failing memory module. The last four characters indicate the failing module of the bank. For example, error code E8002 0080 corresponds to the failing module indicated by the arrow in the figure below.

Review the figure below and find the failing module from your error code.



**Last Four Characters
of Error Code**

0000 = P	0100 = 8
0001 = 0	0200 = 9
0002 = 1	0400 = 10
0004 = 2	0800 = 11
0008 = 3	1000 = 12
0010 = 4	2000 = 13
0020 = 5	4000 = 14
0040 = 6	8000 = 15
0080 = 7	

DID YOU FIND THE FAILING MODULE?

NO Go to page 3-4400-105.

YES Go to the next page.

1. Install a new module on the extended memory adapter (see Chapter 5, page 5-1) in place of the one that failed.

Note: If the last four characters of your error code are 0000, replace both Parity (P) modules with new modules.

2. Repeat the diagnostic test that failed.
-

DID YOU RECEIVE AN ERROR CODE?

NO Your system memory is not functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.

YES Go to the next page.

1. Install a new EMA extended memory adapter in place of the one with the switch settings corresponding to the error code. (See table on page 3-4400-102.)
 2. Repeat the diagnostic test.
-

DID YOU RECEIVE AN ERROR CODE?

NO Your extended memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.

YES Power off the work station.
Remove any remaining EMA extended memory adapters one at a time, starting with extended memory adapter 4, or the highest adapter number in your system unit.
Repeat the diagnostic test after each adapter is removed. When the diagnostic test is successful install a new adapter in place of the last one removed.

You have gone through the PICs without solving the problem. The following steps should aid you in finding additional audio or visual symptoms.

1. Check the complete system for loose or damaged connectors.
 2. If you suspect an intermittent problem, go to section 3-010-1.
-

If you have gone through these procedures and still have a problem, (and have also checked that the problem is not created by software) request technical support from the IBM service center or your company technical coordinator.

Chapter 4. Locations

This chapter is mainly pictorial and is intended to assist the service representative in identifying field replacement units (FRUs) their locations and, where necessary, other components of the work station including pins, sockets, and boards. The arrangement of the figures in this chapter is intended to supplement those figures shown in Chapter 5.

Note: For the locations of other system unit FRUs that are standard PC-AT items, see IBM Personal Computer AT Hardware Maintenance and Service.

DANGER

Switch Off all mainline power from the work station before removing or installing FRUs, cables or other components, or before attempting to service any component that is not correctly installed.

Before starting work on the 5379 display or its associated components, read and observe the CRT and EHT safety procedures given at the front of this manual.

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Display/Mouse/Tablet Adapter Internal Cable	4-21
Keyboard Adapter Cable	4-22
5151 Monochrome Display and Printer	
Adapter	4-23
Grounding Diagrams	4-24

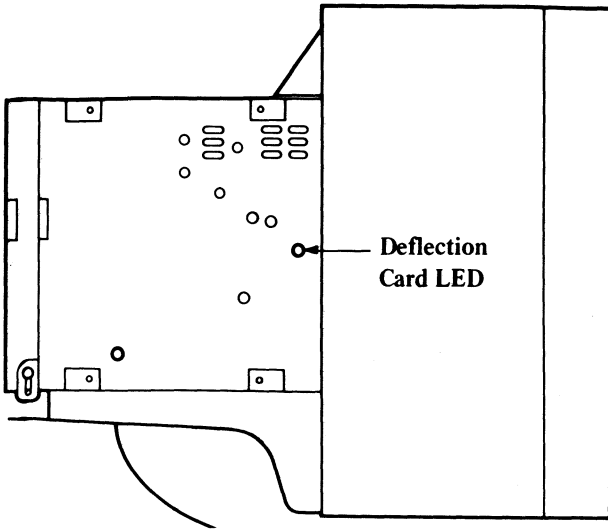


Figure 4-3. Deflection Card LED Location

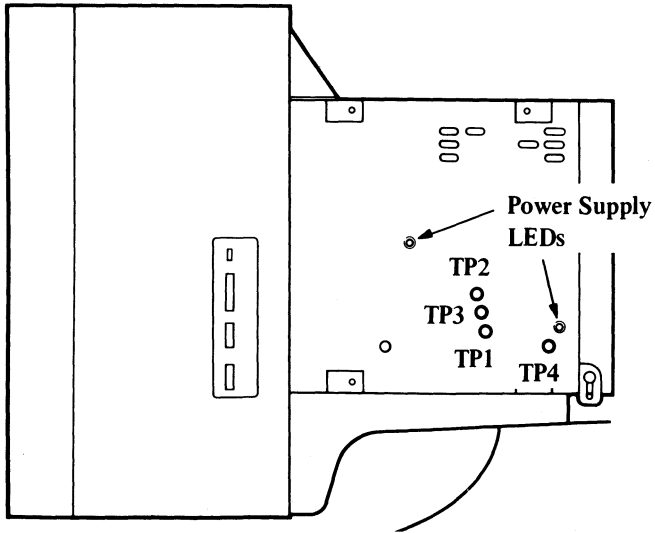


Figure 4-4. Power Supply Card LED and Test Points

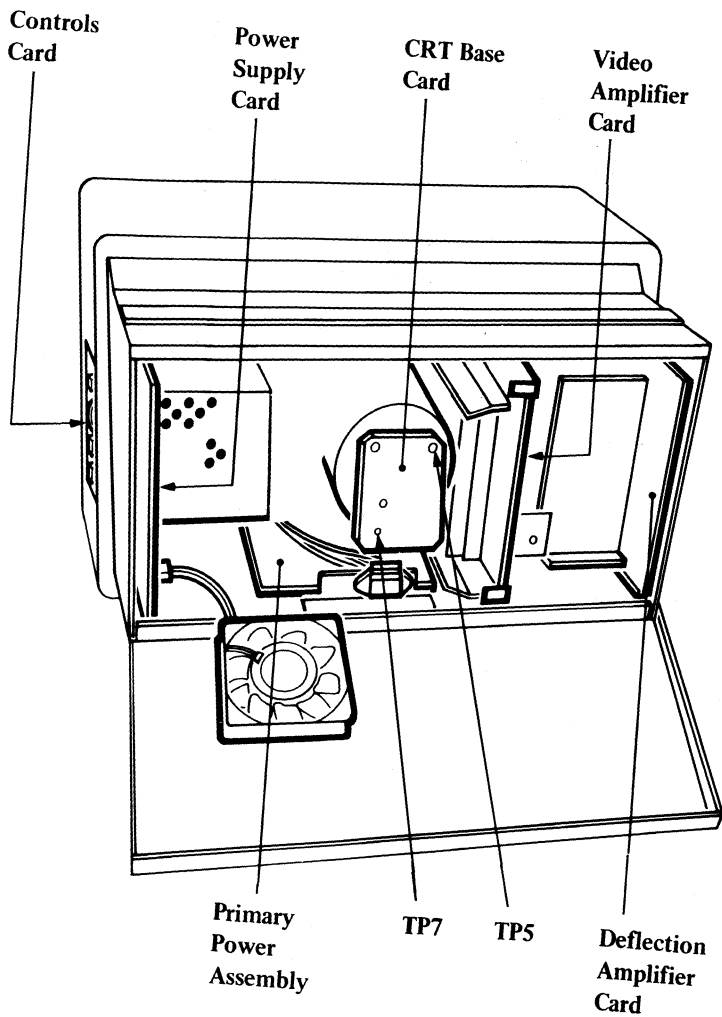


Figure 4-5. 5379 Color Display FRU Cards

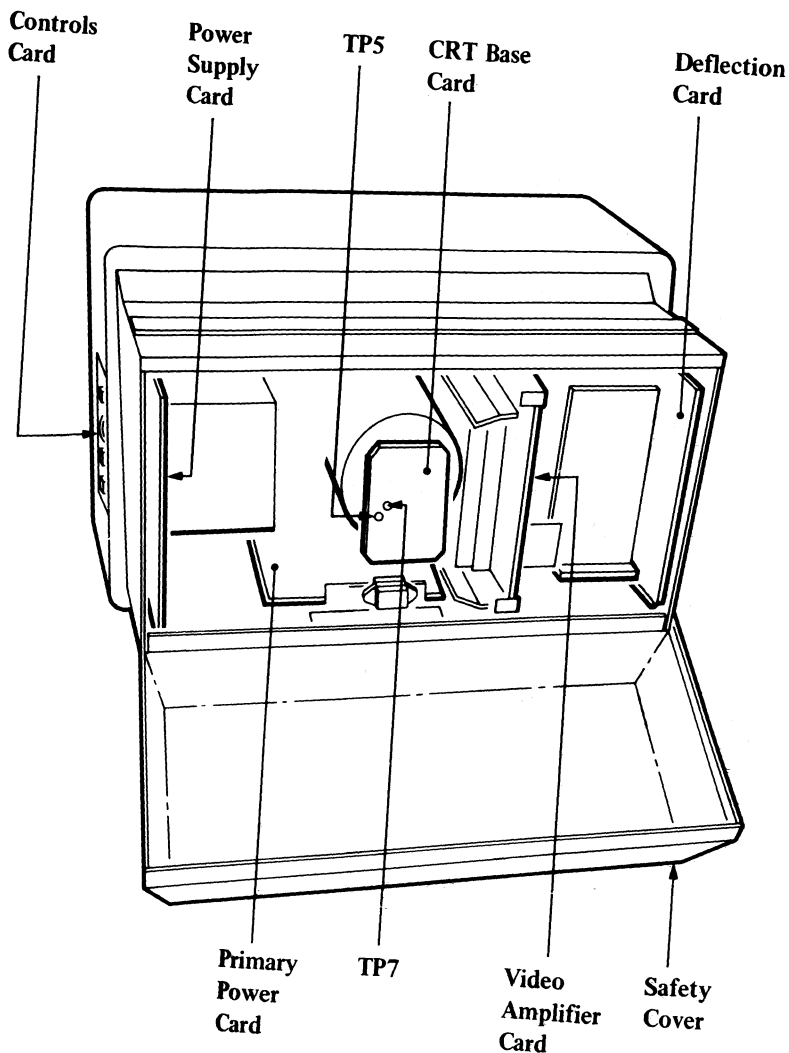


Figure 4-6. 5379 Monochrome Display FRU Cards

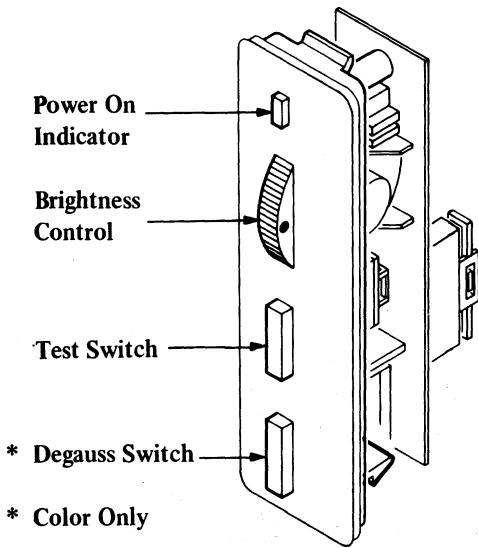


Figure 4-7. 5379 Display Controls Card

5378 Display Attachment Unit

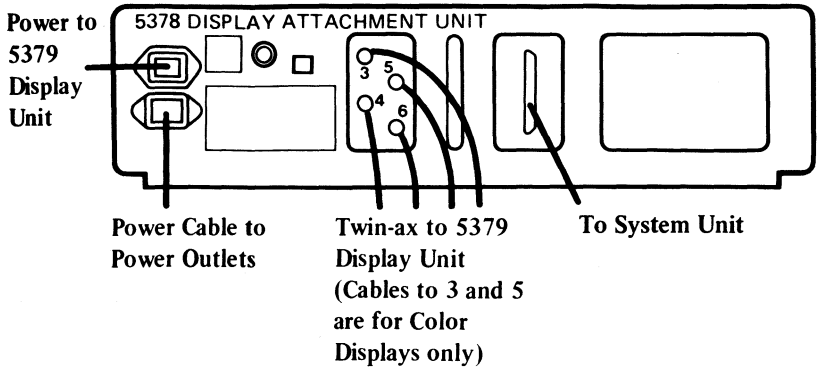


Figure 4-8. 5378 Display Attachment Unit (Rear View)

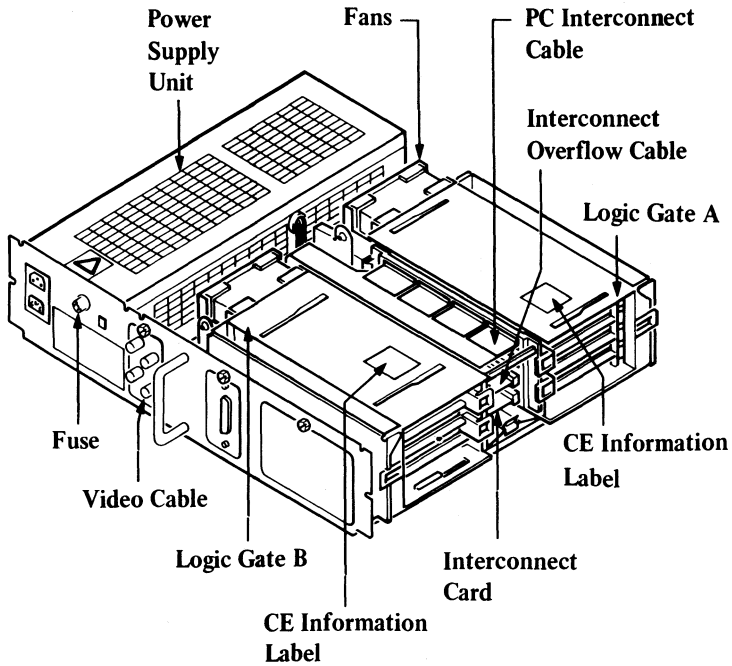
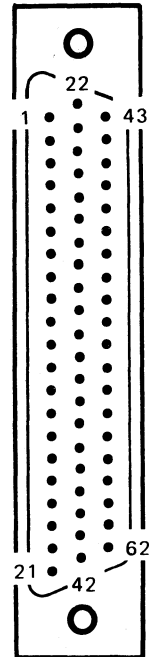


Figure 4-9. 5378 Display Attachment Unit FRUs

DAU PC Flexi-Interconnect Cable

Connector Pin Assignments

PC Pin	Logic Gate Connector and Pin Number	Function
1	--	N/C
2	--	N/C
3	A1D2 B03	N/U
4	A1D2-D04	N/U
5	--	N/C
6	--	N/C
7	A1D2-B07	+ EA17
8	A1D2-B09	+ EA16
9	A1D2-D10	+ EA5
10	--	N/C
11	A1D2-D13	+ EA15
12	A1D3-D13	+ EA11
13	A1D4-B08	+ EA10
14	A1D4-B13	+ EA9
15	A1D5-B07	+ EA1
16	A1D5-B08	+ EA3
17	--	N/C
18	A1D5-B10	+ EA4
19	--	N/C
20	A1D5-B12	- EIOW
21	A1D5-B13	+ EA13
22	A1D2-B02	+ ED5
23	--	N/C
24	--	N/C
25	Logic ground	- 5379 Display present
26	--	N/C
27	--	N/C
28	A1D2-B06	- ERESET
29	A1D2-B08	N/U



Socket Side

Figure 4-10 (Part 1 of 2). DAU PC Flexi-Interconnect Cable Pin Assignments

PC Pin	Logic Gate Connector and Pin Number	Function
30	A1D2-B10	+ EA19
31	A1D2-B12	+ EA14
32	A1D4-B13	+ EA12
33	A1D3-B13	+ EA18
34	A1D4-D06	- EMEMR
35	A1D4-D09	- EMEMW
36	A1D5-D06	+ EAO
37	--	N/C
38	A1D5-B09	+ EA6
39	A1D5-D09	- EIOR
40	A1D5-D10	+ EA8
41	A1D5-B11	+ EA2
42	A1D5-D12	+ EA7
43	--	N/C
44	A1D2-D02	+ ED6
45	A1D2-B04	+/- Ready
46	--	N/C
47	A1D2-B05	+ ED7
48	A1D2-D05	+ ED1
49	A1D2-D07	- Ext.Channel Check
50	A1D2-D09	+ Ext.IRQ
51	A1D2-B11	+ EDO
52	A1D2-D12	+ ED2
53	A1D3-B12	+ ED4
54	--	N/C
55	--	N/C
56	A1D4-D13	+ ED3
57	A1D2-D08	Logic ground
58	A1D2-D08	Logic ground
59	A1D3-D08	Logic ground
60	A1D4-D08	Logic ground
61	A1D5-D08	Logic ground
62	A1D5-D08	Logic ground

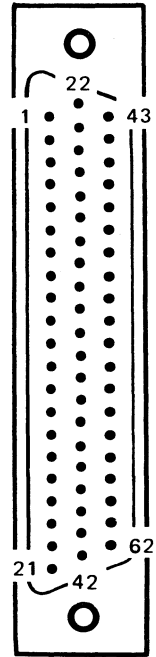
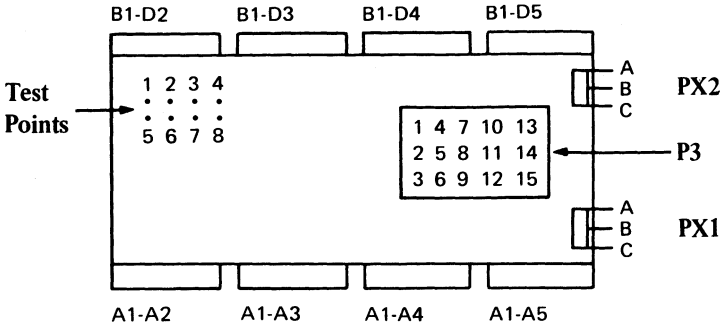


Figure 4-10 (Part 2 of 2). DAU PC Flexi-Interconnect Cable Pin Assignments

Interconnect Card

Connector Pin Assignments

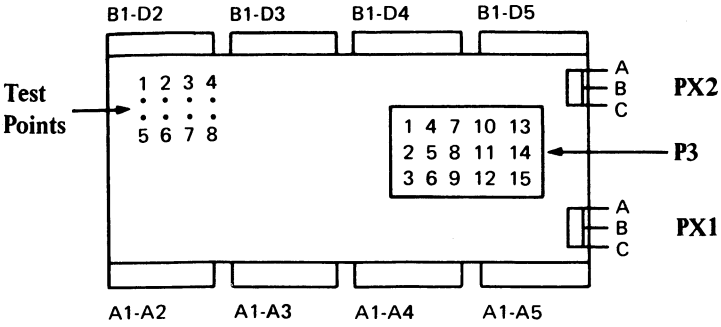
Connector P3



P3 Pin	Destination Connector/Pin	Signal Name
1	A1A2-D03, J03	+ 5 V
2	A1A2-P03, U03	+ 5 V
3	B1D2-D03, J03	+ 5 V
4	B1D2-P03, U03	+ 5 V
5	Senses Pins 1 to 4 (above)	+ 5 V Sense
6	A1A2-D11	+ 12 V
7	PX1-A, PX2-A	Return
8	A1A2-D05, J08	Return
	A1A2-P08, U08	
	B1D2-D08, J08	
	B1D2-P08, U08	
9	A1A2-D06	- 12 V
10	B1D2-U06, U11	- 5.2 V
11	See P3 pin 7 and 8	Return
12	See P3 pin 7 and 8	Return
13	See P3 pin 10	- 5.2 V
14	See P3 pins 7,8, 11,12	+5 V Sense return
15	TP3	Power-On reset

Figure 4-11. Interconnect Card Pin Assignments

Test Points



Test Point	Source	Signal Name
1	B1D2 - B07	+10 MHz
2	B1D2 - D09	+20 MHz
3	P3 - 15	- POR
4	B1D2 - B10	+16 MHz
5	B1D2 - D05	+5 MHz
6	A1A2 - P10	-XXP Halt
7	A1A2 - S11	-XXP Reset
8	A1A2 - U09	-UC Reset

Figure 4-12. Interconnect Card Test Points

DAU Video Cable

Connector Pin Assignments

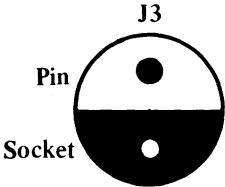
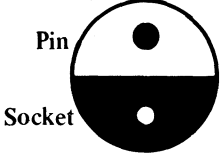
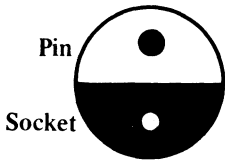
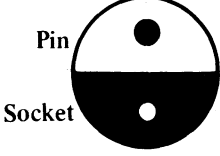
Video Connectors	Logic Board B Connectors
 <p>J3</p>	<p>A3 D05 } - A3 D04 } + Red</p>
 <p>J5</p>	<p>A3 D11 } - A3 D10 } + Blue</p>
 <p>J4</p>	<p>A3 D09 } - A3 D07 } + Green</p>
 <p>J6</p>	<p>A3 D12 } Vert Sync A3 D13 } Horiz Sync</p>

Figure 4-13. DAU Video Cable Connectors and Pin Assignments

Logic Gate Connector and Pin Assignments

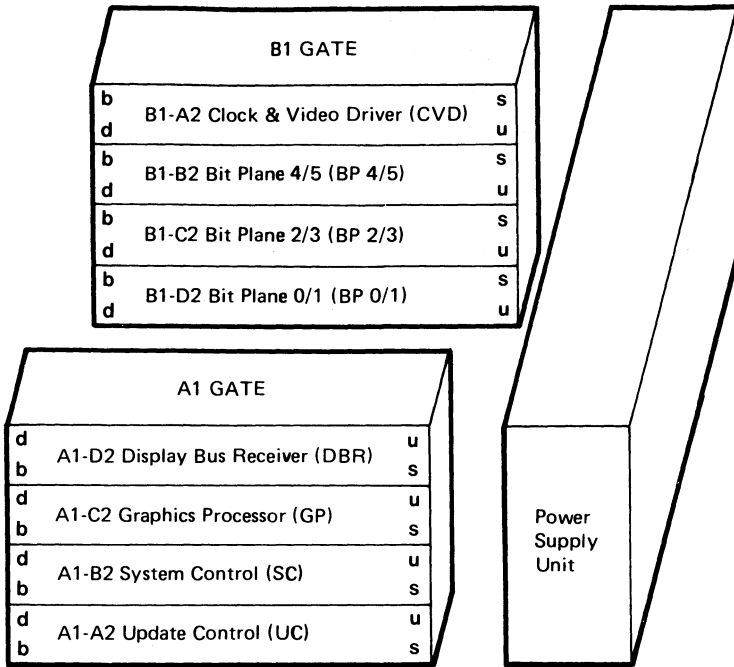
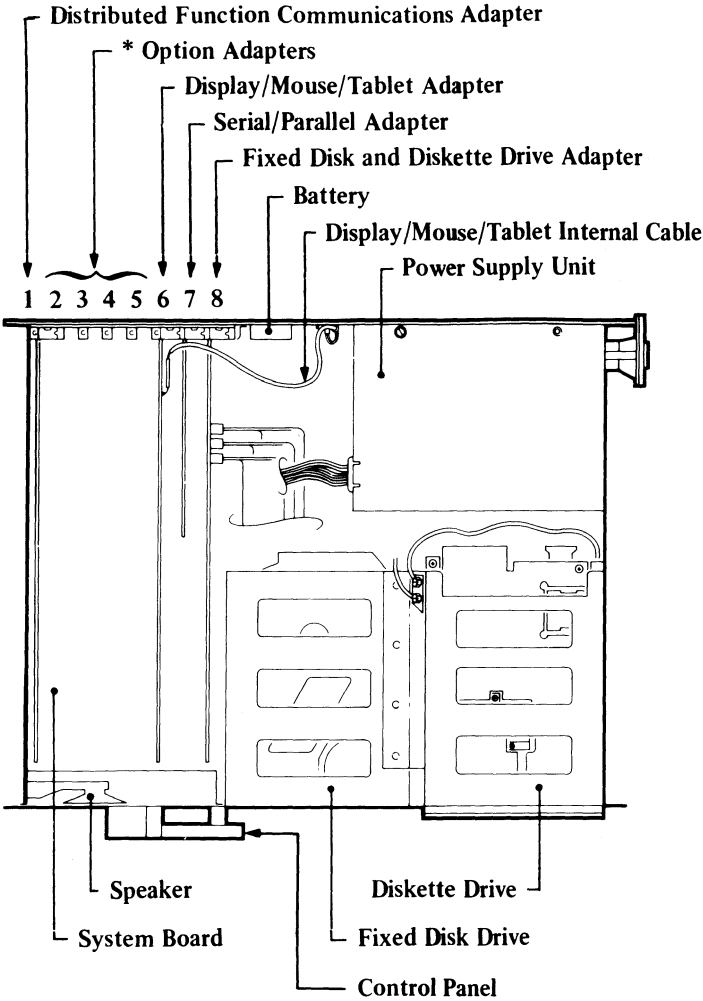


Figure 4-14. Logic Gate Connector and Pin Assignments

Note: Bit Plane Card 0/1 is used only for Color (C01) Displays.

System Unit



Recommended Slot Positions for Optional Adapters.

2. 128 K-byte Storage
3. 512 K-byte Storage
4. General Purpose Interface Bus Adapter (IEEE-488)
5. Monochrome Display and Printer Adapter

Figure 4-15. System Unit FRUs

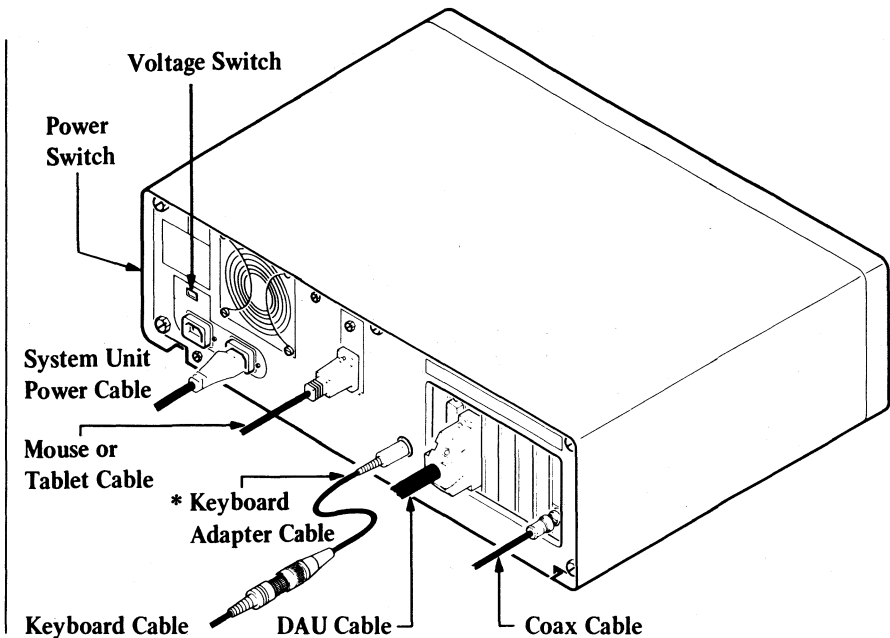


Figure 4-16. System Unit Switches and Cable Connections

*IBM 3270 PC Keyboard Adapter Cable (IBM Part 1887915). Applicable only to IBM 3270 Personal Computer Keyboards)

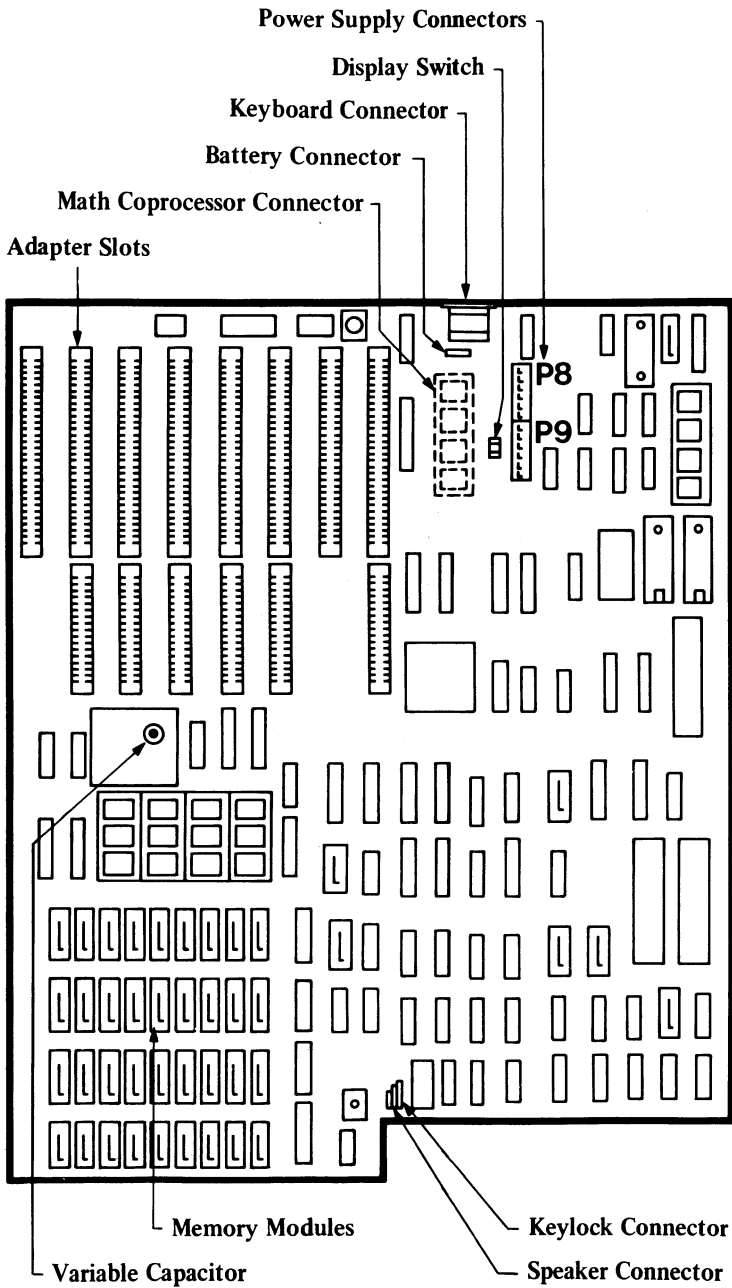


Figure 4-17. System Board (Type 1)

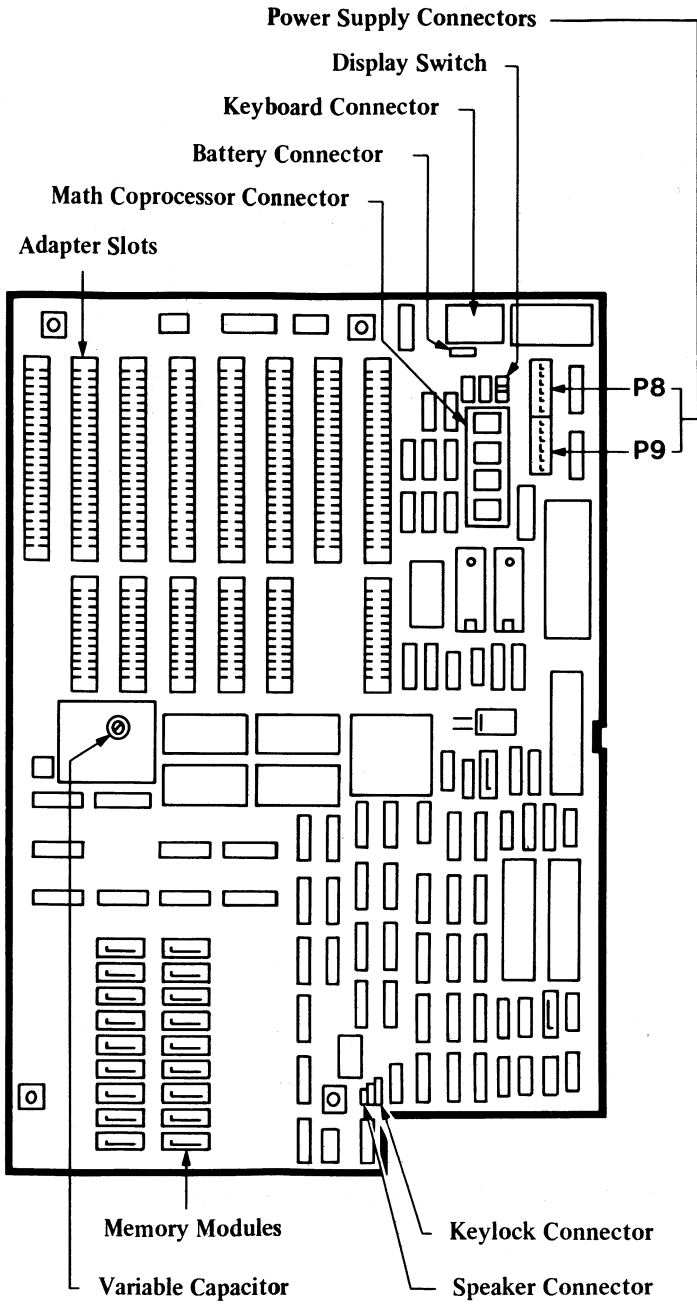


Figure 4-18. System Board (Type 2)

Printer Signal Cable

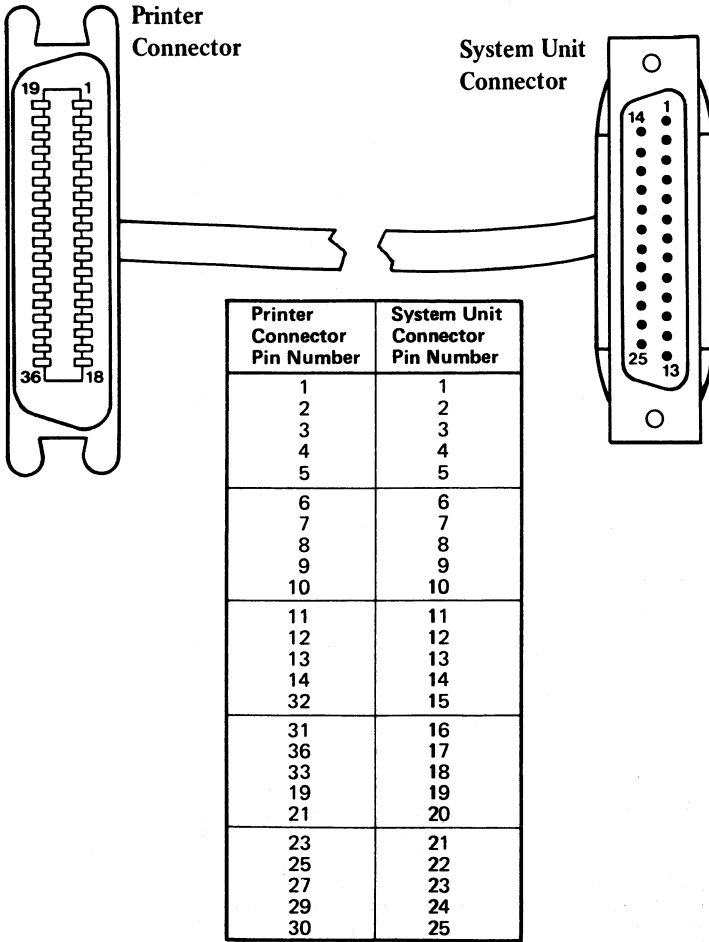


Figure 4-19. Printer Signal Cable Pin Assignments

Option Adapters

Display/Mouse/Tablet Adapter

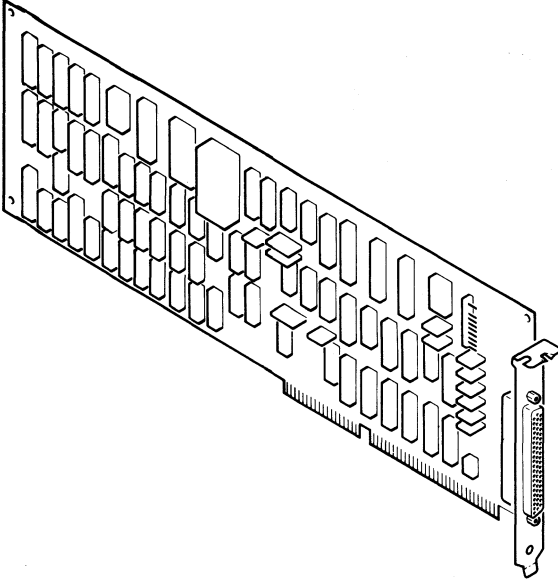


Figure 4-20. Display/Mouse/Tablet Adapter

Display/Mouse/Tablet Adapter Internal Cable

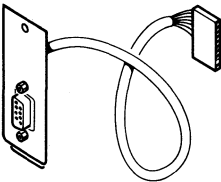


Figure 4-21. Display/Mouse/Tablet Adapter Internal Cable

Keyboard Adapter Cable

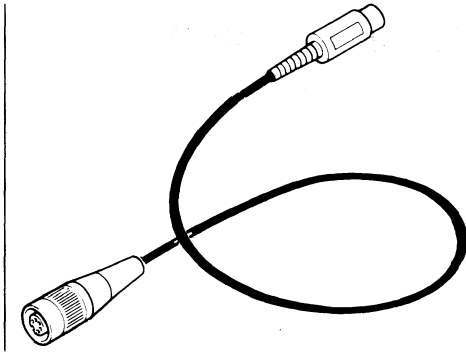


Figure 4-22. IBM 3270 Personal Computer Keyboard Adapter Cable (IBM Part 1887915)

5151 Monochrome Display and Printer Adapter

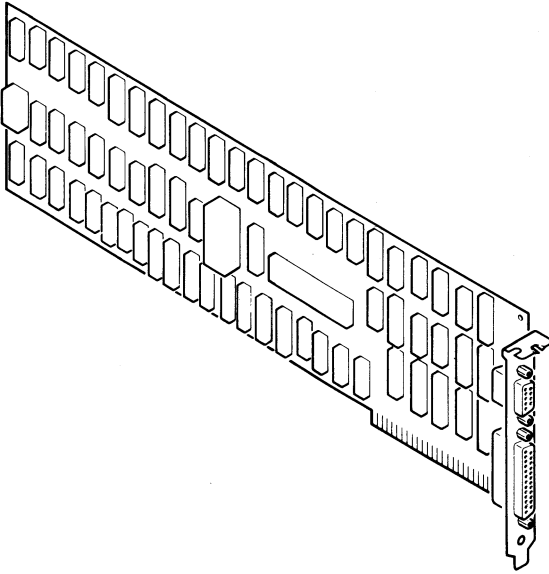
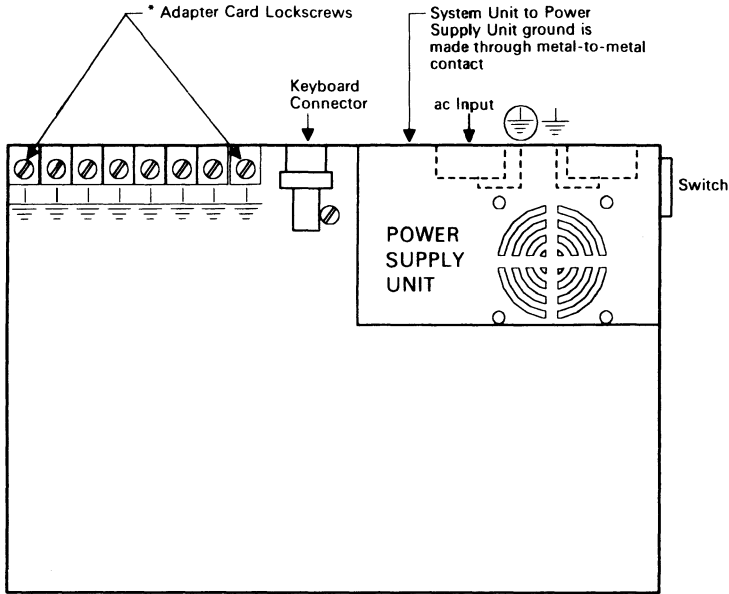


Figure 4-23. 5151 Monochrome Display and Printer Adapter (Right View)

Grounding Diagrams



* Adapter cards are grounded to the System Unit by the Adapter Card lockscrews

Figure 4-24. Grounding Diagram, System Unit

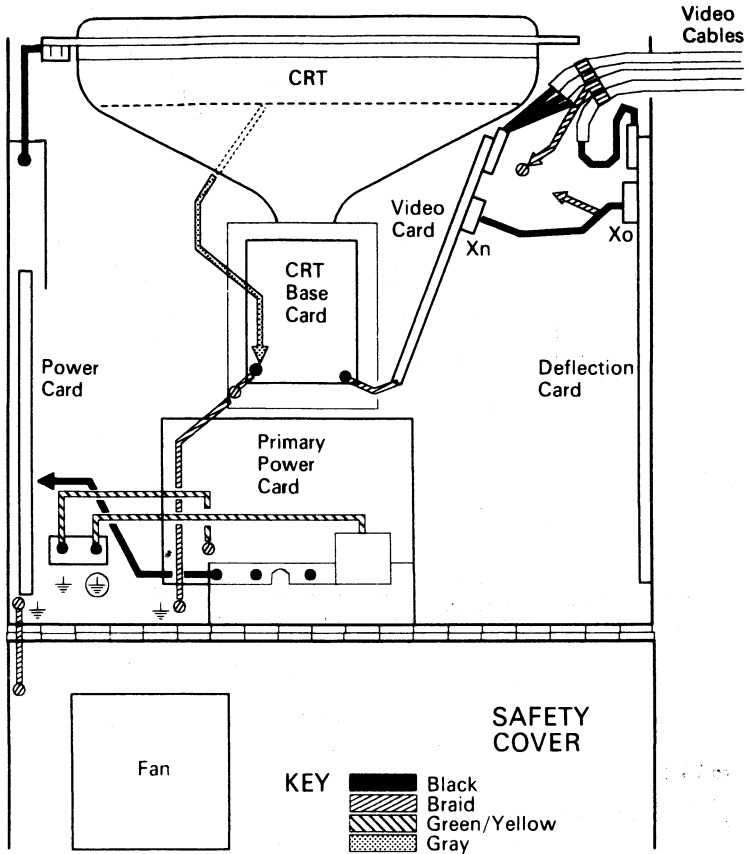


Figure 4-25. Grounding Diagram, 5379 Color Display

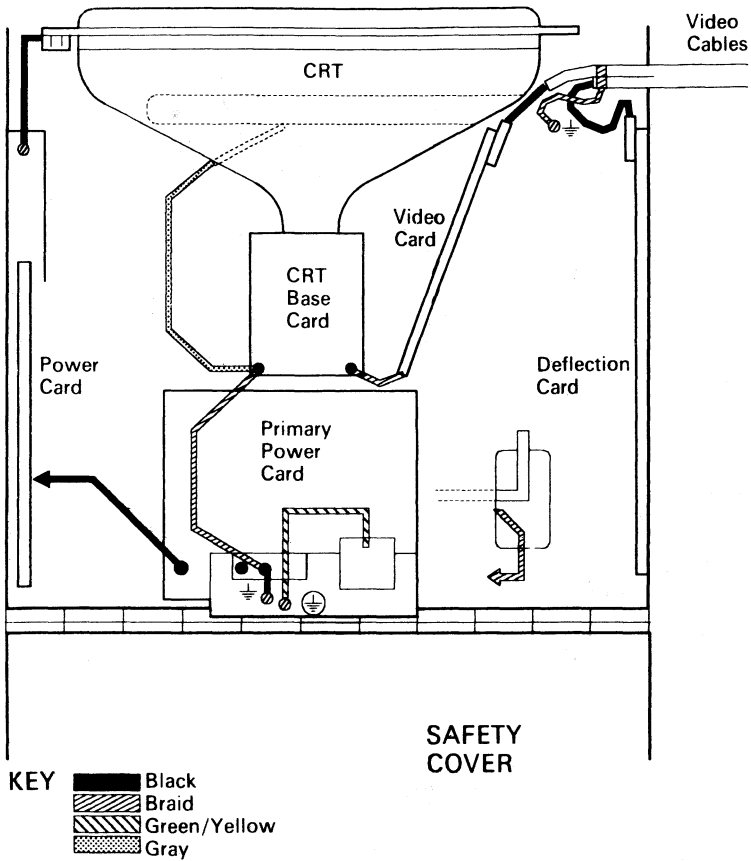


Figure 4-26. Grounding Diagram, 5379 Monochrome Display

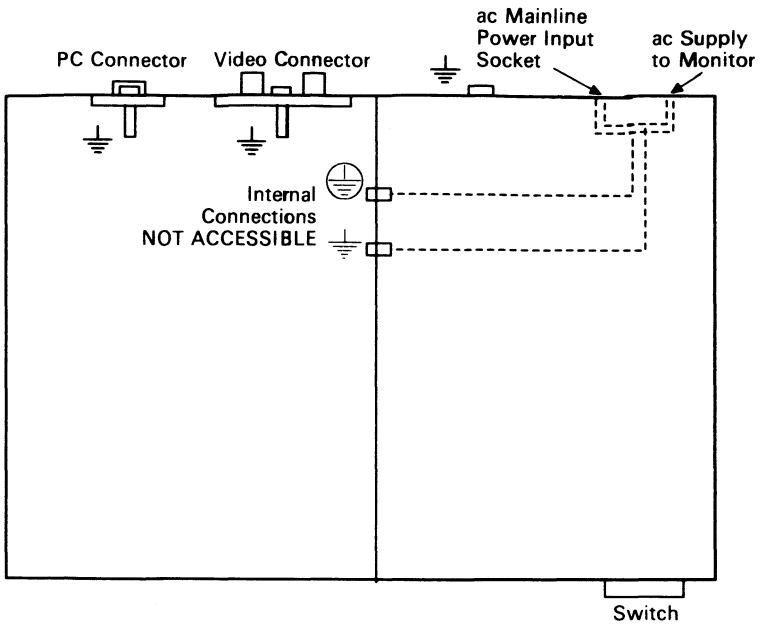


Figure 4-27. Grounding Diagram, Display Attachment Unit

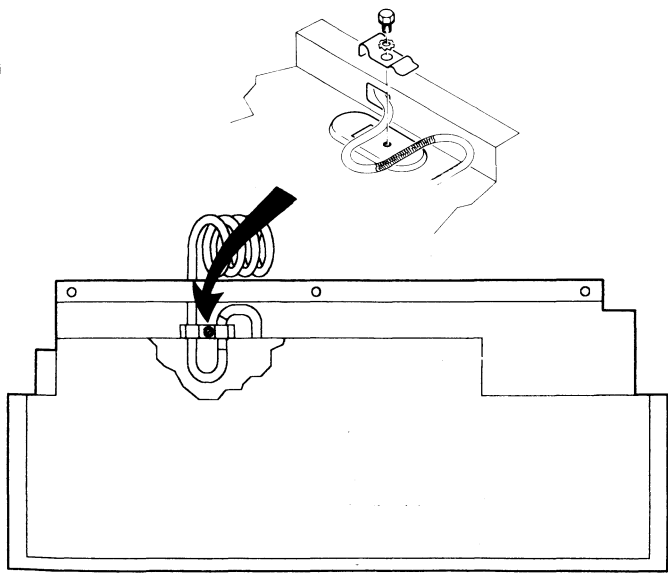


Figure 4-28. Grounding Diagram, 3270 Keyboard



Chapter 5. Removal, Installation, and Adjustment Procedures

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General Information

This chapter contains the information needed to remove a failing FRU or work station element (WSE), and how to install a new one. Information is also included on adjustments and switch settings; however, where this information is contained completely in the IBM Personal Computer AT *Hardware Maintenance and Service*, reference is made to that publication.

DANGER

Switch Off all mainline power from the work station before removing or installing FRUs, cables or other components, or before attempting to service any component that is not correctly installed.

Before starting work on the 5379 display or its associated components, read and observe the CRT and EHT safety procedures given at the front of this manual.

Specific components described in this chapter are:

System Unit FRUs (listed below) that are unique to the personal computer AT/GX system. For FRUs that are standard system unit items, see IBM Personal Computer AT *Hardware Maintenance and Service*.

- Distributed function communications adapter
- Display/mouse/tablet adapter
- Keyboard adapter cable (for IBM 3270 Personal Computer keyboards only).
- Internal mouse/tablet cable
- General purpose interface bus adapter
- EMA extended memory adapters (5373 system unit only).

5379 Displays (color and monochrome) and FRUs inside the displays.

Note: Although the FRU names and the removal and installation procedures are the same for the 5379 color and monochrome displays, the components of the color FRU may differ from those of the monochrome FRU. Review Chapter 7, Parts Catalog for the FRU part numbers that are specific to your display unit.

The FRUs are:

- Power supply card
- Primary power assembly
- Video amplifier card
- Deflection card
- Controls card
- CRT base card
- CRT and bezel assembly
- Display cables
- Power cable
- Video twin-ax cables
- Degauss coil (color display only)
- Cover with tilt and swivel assembly
- Rear cover
- Fan (color display only).

5378 Display Attachment Unit and FRUs inside the unit. The FRUs are:

- Display bus receiver card (DBR)
- Graphics processor card (GP)
- Update control card (UC)
- System control card (SC)
- Bit plane card 0 and 1 (color) (BP0/1)
Bit plane card 2 and 3 (mono and color) (BP2/3)
Bit plane card 4 and 5 (mono and color) (BP4/5)
- Clocks and video driver card (CVD)
- Interconnect card
- Interconnect overflow flexi-cable
- Bus receiver flexi-cable
- Logic boards for gates A and B
- Power supply unit
- Cables
 - Power cables
- Fans
- Covers.

Keyboards

Keyboard	System Unit Type Number		
	5373 (All models)	5170 with 5373 FC 7002 Option Kit	5170 with 5170 FC 7012 Option Kit
IBM 3270 PC Keyboard	Yes*	Yes*	No
IBM 3270 PC APL Keyboard	Yes*	Yes*	No
IBM PC-AT Keyboard	Yes	Yes	All 5170 models, excluding Model 339
IBM Enhanced PC Keyboard	No	No	5170 Model 339 only

* Note: IBM 3270 Personal Computer Keyboard Adapter Cable, (IBM Part 1887915) also required for these configurations.

General

Warning:

1. The power-off (system unit first) and power-on (system unit last) sequences must be observed at all times (see Chapter 1, page 1-18).
2. **The primary power LED should be on if mainline power is reaching the 5379 display. However, if the LED is Off, this does not mean that the display is disconnected from the mainline power outlet.**
3. Always lock the tilt and swivel mechanism in the desired position before starting removal or installation procedures.
4. Prepare a clean, flat, work-surface before starting the following procedures.

CAUTION

The display weighs approximately 35 kg (75 lb), and the system unit weighs approximately 22 kg (50 lb); you will need aid in lifting the units. Always protect the work-surface from damage when moving the units.

5. Place the unit to be checked near the edge of the work-surface, leaving enough clearance in front of the unit for its cover to be removed.

Handling of Electrostatic-Discharge- (ESD) Sensitive Parts

Many products use parts that are known to be sensitive to electrostatic discharge (ESD). To prevent damage when you work with ESD-sensitive parts, observe the following instructions; do these in addition to all the usual precautions, such as switching off power before removing logic cards.

- Keep the ESD-sensitive part in its original shipping container (a special “ESD bag”) until you are ready to install the part into the machine.
- Make the least-possible movements with your body to prevent an increase of static electricity from clothing fibers, carpets, and furniture.
- Just before touching the ESD-sensitive part, discharge to the machine any static electricity in your body; do this by touching the metal frame or cover of the machine. If possible, keep one hand on the frame when, for example, you are inserting or removing a logic card.
- Hold the ESD-sensitive part by its edge connector cover; *do not touch its pins*. If you are removing a pluggable module, use the correct tool.
- Do not place the ESD-sensitive part on the machine cover or on a metal table; if you need to put down the ESD-sensitive part for any reason, first put it into its special bag.

Machine covers and metal tables are electrical grounds. They increase the risk of damage because they make a discharge path from your body through the ESD-sensitive part. (Large metal objects can be discharge paths without being grounded.)

- Prevent ESD-sensitive parts from being accidentally touched by other personnel such as service representatives or customers. Install the machine covers when you are not working on the machine, and do not put unprotected ESD-sensitive parts on a table.
- If possible, keep all ESD-sensitive parts in a grounded metal cabinet (case).
- Be extra careful in working with ESD-sensitive parts when cold-weather heating is used because low humidity increases static electricity.

System Unit (S5100)

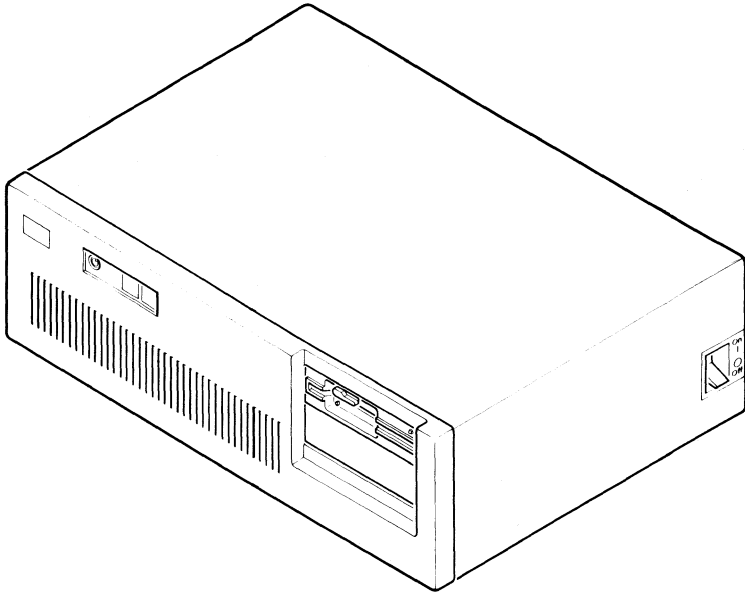


Figure 5-1. System Unit (Front View)

To make a repair, perform the correct removal procedures and discard the FRU that has failed. Then perform the correct procedures to install a new FRU in its place.

Field Replaceable Units (FRUs)

For the removal and installation procedures for FRUs that are standard system unit items (and for instructions on the removal and installation of **all** adapter cards), review the *IBM Personal Computer AT Hardware Maintenance and Service*.

Locking the Fixed Disk Drive (S5001)

Warning: If a system unit has a fixed disk drive, be careful. Moving the unit can damage the drive and you might lose the data on the disk. To prevent damage to fixed disk drives they should be locked before you move the system unit.

You can lock a fixed disk drive using advanced diagnostics option 3. To do so, perform the following procedure:

1. Power off the work station in the correct sequence. See Chapter 1, page 1-17.
2. Insert the advanced diagnostics diskette, into drive A of the system unit.
3. Power on the work station in the correct sequence. See Chapter 1, page 1-18.
4. When the SELECT AN OPTION menu is displayed, key in 3 and press **←** to select PREPARE SYSTEM FOR RELOCATION. (Key the 3 on the top row of the keyboard keys, not the 3 on the numeric keypad.)
5. When the FIXED DISK(S) READY FOR SHIPPING message is displayed, power off the work station in the correct sequence (see Chapter 1, page 1-17).
6. Remove the advanced diagnostics diskette from the system unit.

Note: Setting the power switch of the system unit to On always unlocks the fixed disk if it is locked.

Disconnecting the System Unit from the Work Station (S5110)

1. Power off the work station in the correct sequence (system unit first), see Chapter 1, page 1-17.
2. Set the power switch of the printer (if installed) to Off (see 5-128).
3. Set the power switch of any other devices connected to the work station to Off.

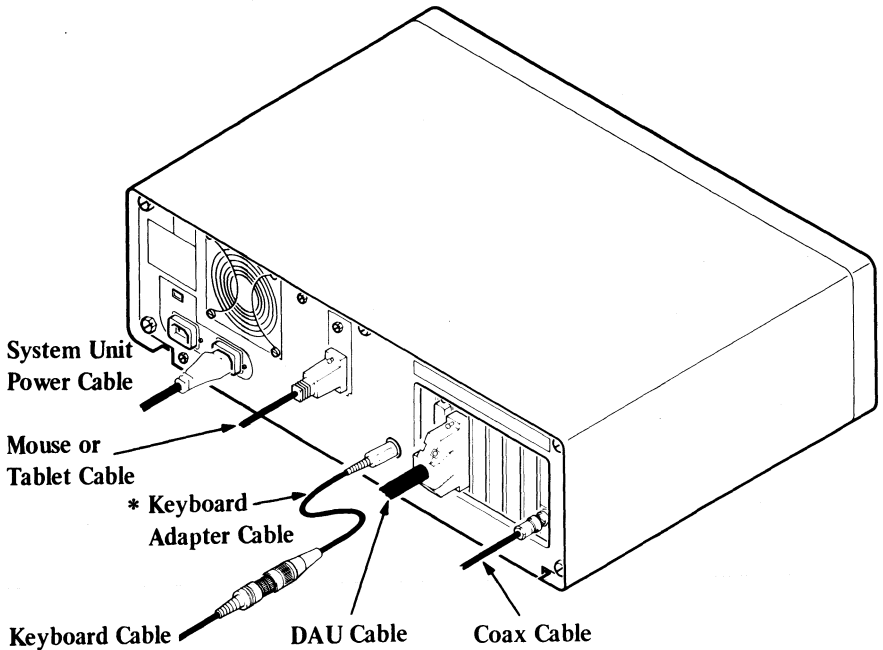


Figure 5-2. System Unit Cable Connections

4. Disconnect the display attachment unit, the system unit, and the printer power cables from their mainline power outlets.
5. Disconnect the power cables of any optional devices from their mainline power outlets.
6. Disconnect the power cable from its connection with the system unit.
7. Loosen the fastening screws and disconnect the DAU cable from its connection with the system unit.
8. Disconnect the keyboard cable or keyboard adapter cable (if installed) from the system unit.
9. Disconnect the system unit from all optional devices that may be connected to it.
10. Remove the system unit from the work-station area.

Connecting a System Unit into the Work Station (S5115)

1. Perform all the procedures described for disconnecting a system unit from the work station (**S5110**), in reverse order.
2. Power on the work station in the correct sequence (system unit last), see Chapter 1, page 1-18.

Removing Keyboard Adapter Cable (IBM 3270 Personal Computer Keyboards only) (S5116)

1. Power off the work station in the correct sequence (system unit first), see Chapter 1, page 1-17.
2. Loosen the locking ring and disconnect the keyboard adapter cable from its connection with the keyboard cable.
3. Pull the 5-pin connector from its socket at the rear of the system unit.
4. Unscrew the two fastening screws and remove the keyboard adapter cable from its 9-pin-socket connection at the rear of the system unit.

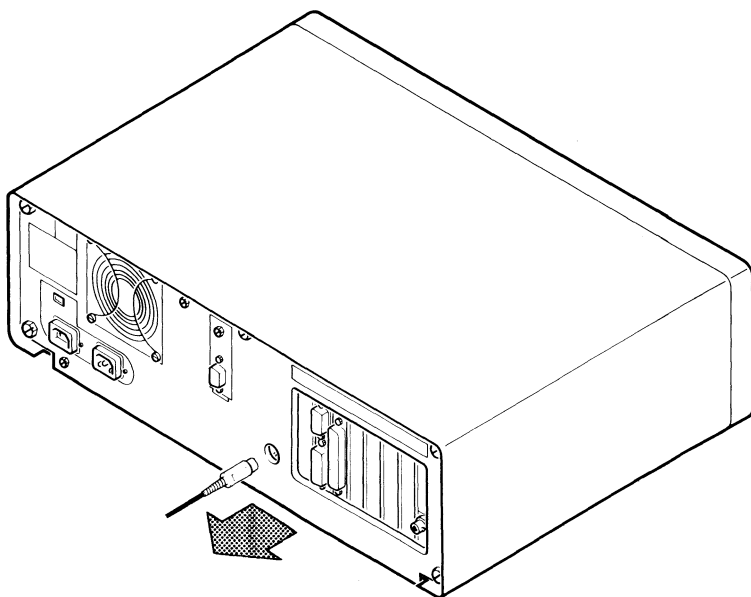


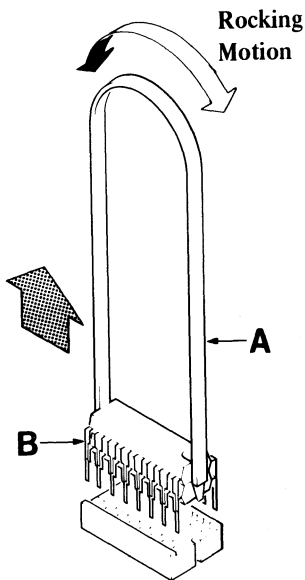
Figure 5-3. Removing the IBM 3270 Personal Computer Keyboard Adapter Cable

Installing Keyboard Adapter Cable (IBM 3270 Personal Computer Keyboards only) (S5117)

1. Perform all the procedures described for removing the keyboard adapter cable (S5116), in reverse order.
2. Power-on the work station in the correct sequence (system unit last), see Chapter 1, page 1-18.

EMA Extended Memory Module Removal (5373 System Unit Only) (S5118)

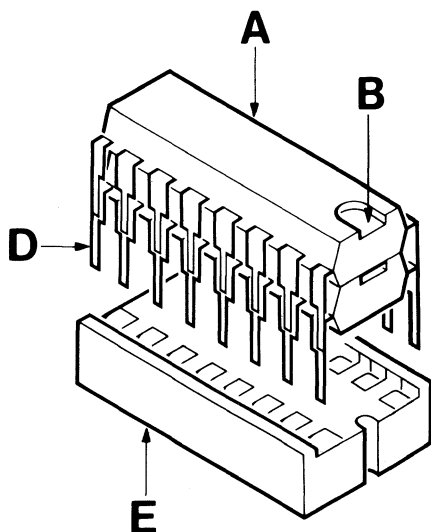
1. Power off the work station in the correct sequence (system unit first), see Chapter 1, page 1-17.
2. Remove the system unit cover, see IBM Personal Computer AT *Hardware Maintenance and Service*.
3. Find the failing extended memory adapter, and identify the failing module (see Chapter 3, page 3-4400-97).
4. Remove the extended memory adapter see IBM Personal Computer AT *Hardware Maintenance and Service*.
5. Grasp the failing module **B** with the module puller **A** and carefully lift one end and then the other, to avoid bending the pins.



EMA Extended Memory Module Installation (5373 System Unit Only) (S5119)

Note: Only 128K-byte memory modules are installed on the 512K-byte Extended Memory Adapter.

1. Line up the module **A** so that the notch **B** faces the same direction as those on the other modules.
2. Line up the module pins **D** with the sockets on the connector **C**.
3. Carefully press the module onto the connector.
4. Install the memory expansion adapter see IBM Personal Computer AT *Hardware Maintenance and Service*.
5. Install the system unit cover see IBM Personal Computer AT *Hardware Maintenance and Service*.



5379 Display (S5500)

Warning:

1. The power-off (system unit first) and power-on (system unit last) sequences must be observed at all times (see Chapter 1, page 1-17 and 1-18).
2. The primary power LED should be On if mainline power is reaching the 5379 display. However, if the LED is Off this does not mean that the display is disconnected from the mainline power outlet.
3. Always lock the tilt and swivel mechanism in the correct position before starting removal or replacement procedures.

5379 Display Covers

5379 Display Rear Cover

Removing the 5379 Rear Cover (S5510)

1. Power off the work station in the correct sequence (system unit first), (see Chapter 1, page 1-17).

2. Loosen completely the two hexagonal-socket screws in the rear cover of the display using a 4-mm hexagon wrench (IBM part 7231), and remove the cover.

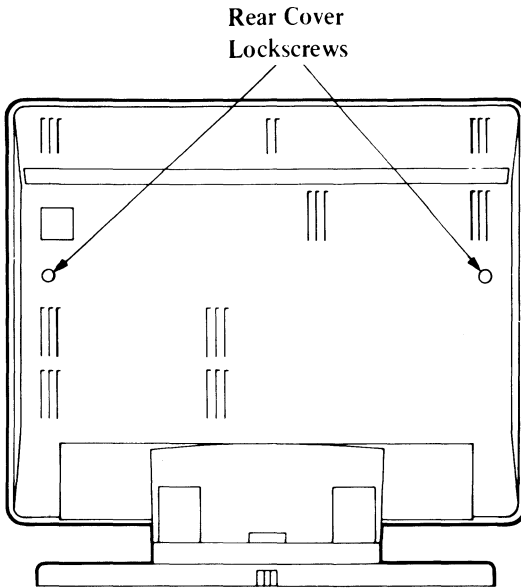


Figure 5-4. Rear Cover Lockscrews

Installing the Rear Cover (S5515)

1. Install in the reverse sequence.
2. Power on the work station in the correct sequence (system unit last), see Chapter 1, page 1-18.

5379 Display Safety Cover

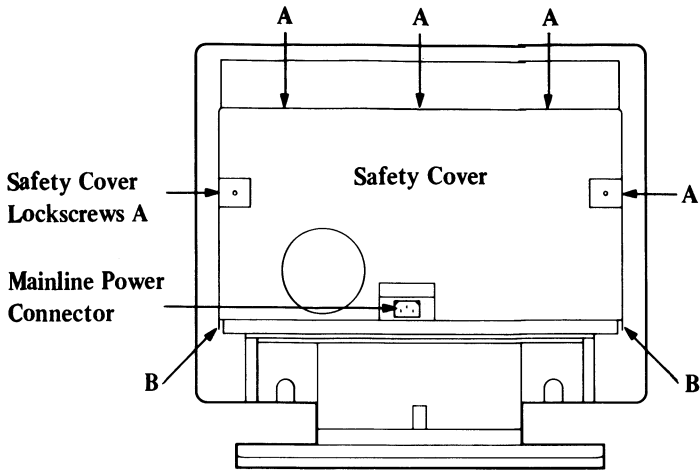


Figure 5-5. Safety Cover Lockscrews

Opening the Safety Cover (S5520)

Observe the figure above.

1. Read the warning notices and complete the instructions in **(S5500)**.
2. Remove the rear cover **(S5510)**.
3. Unplug the mainline power connector.
4. Loosen (do not remove) the two screws marked B. Remove the five safety-cover lockscrews (marked A).

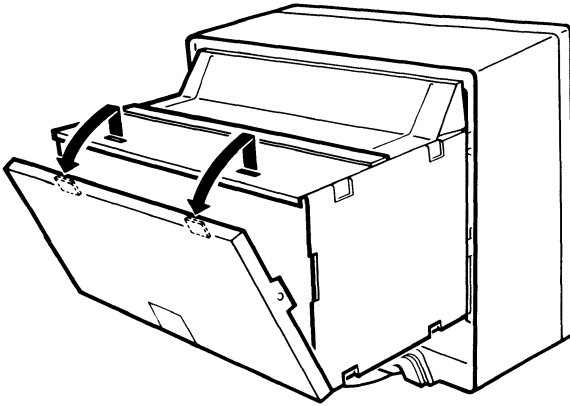


Figure 5-6. Opening the Safety Cover

5. Hold the sides of the safety cover and lift it vertically until the lugs on the top disengage from the slots.
6. Swing the cover toward you, let the cover fall down onto the pivot screws, then swing it into a horizontal position.
7. The internal FRUs are now exposed (see the next page).

Color Display - Internal FRUs

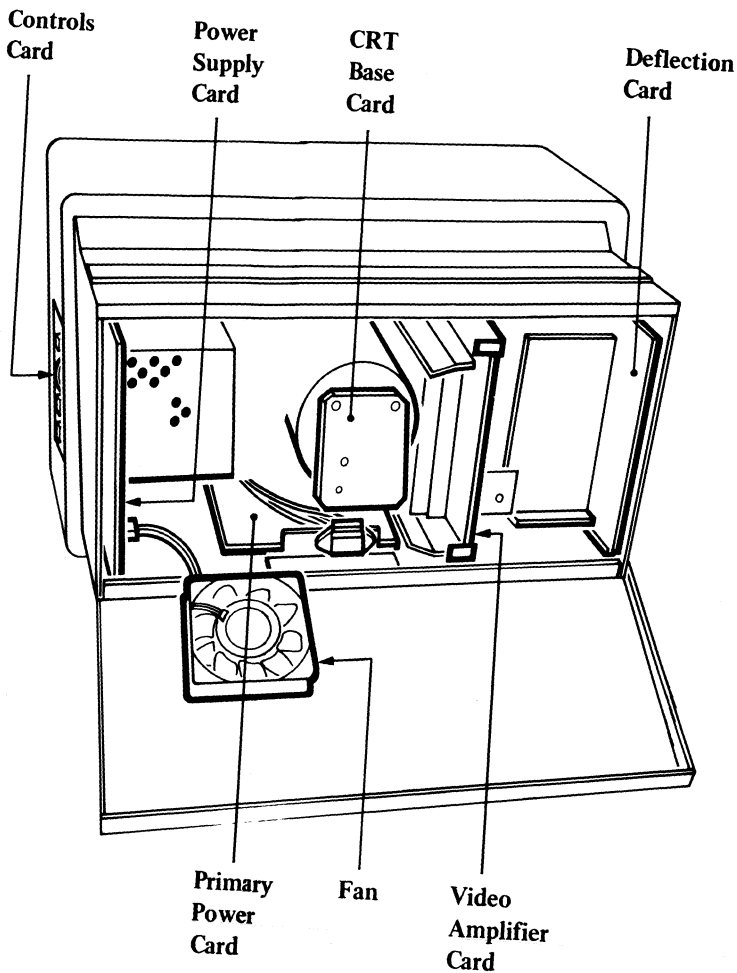


Figure 5-7. 5379 Color Display - Internal FRUs

Monochrome Display - Internal FRUs

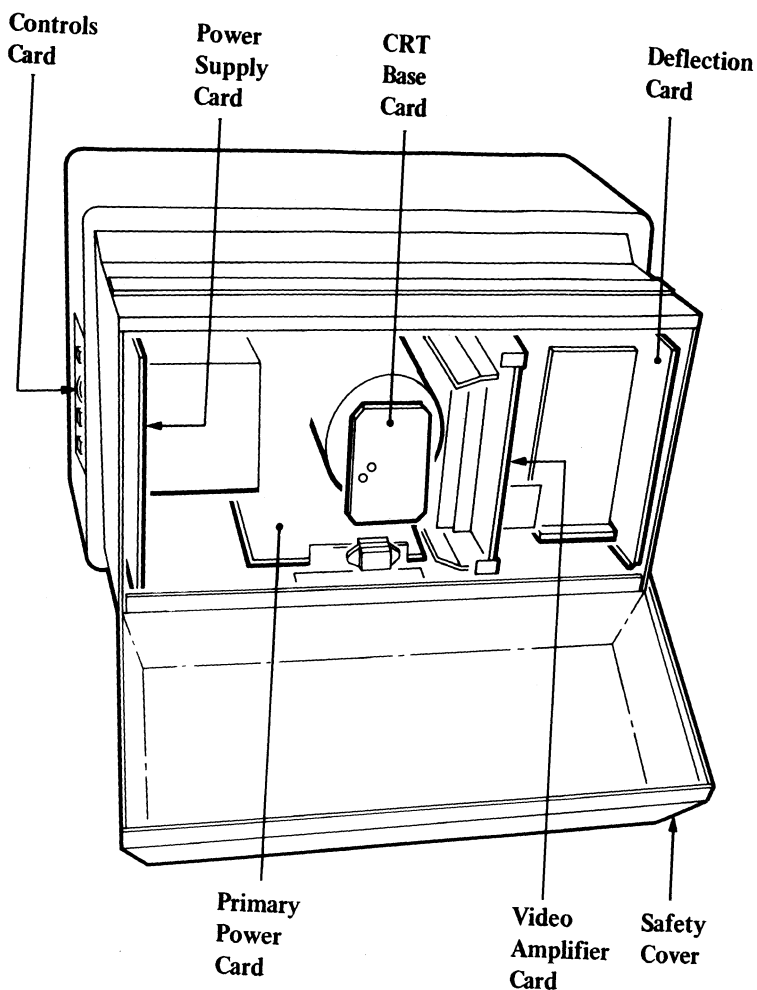


Figure 5-8. 5379 Monochrome Display - Internal FRUs

Installing the 5379 Safety Cover (S5525)

1. Install in the reverse sequence.

5379 Fan (Color Display Only)

Removing the 5379 Color Display Fan (S5530)

1. Read the warning notices and complete the instructions in (S5500).
2. Remove the rear cover (S5510).
3. Open the safety cover (S5520).

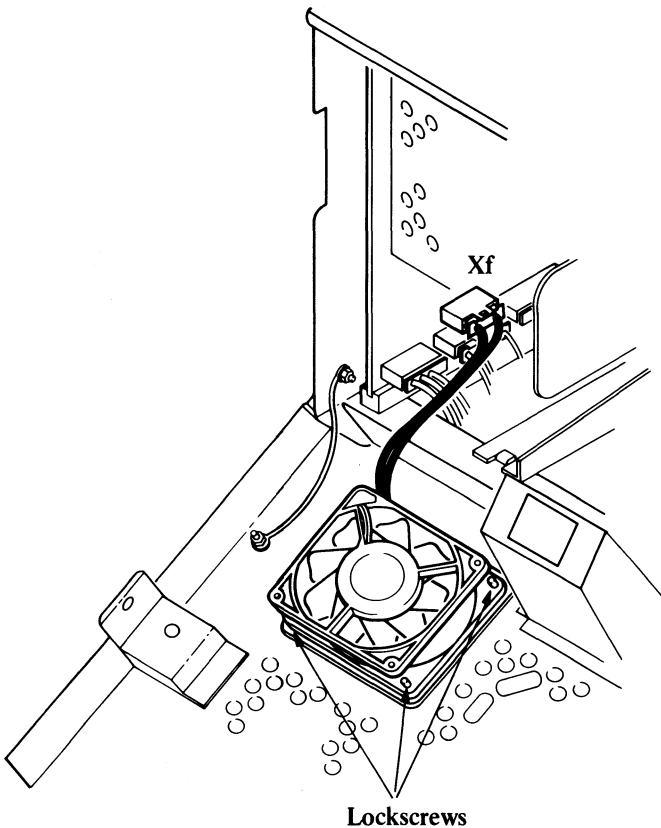


Figure 5-9. Fan Assembly

4. Remove the connector Xf from the power supply unit.
5. Remove the three screws that fasten the fan to the safety cover.
6. Remove the rubber mounting-pad from the fan.

Removal of the fan is now complete.

Installing the 5379 Color Display Fan (S5535)

Install the fan in the reverse sequence.

5379 Display Power Supply Card

Removing the Power Supply Card (S5540)

1. Read the warning notices and complete the instructions in (S5500).

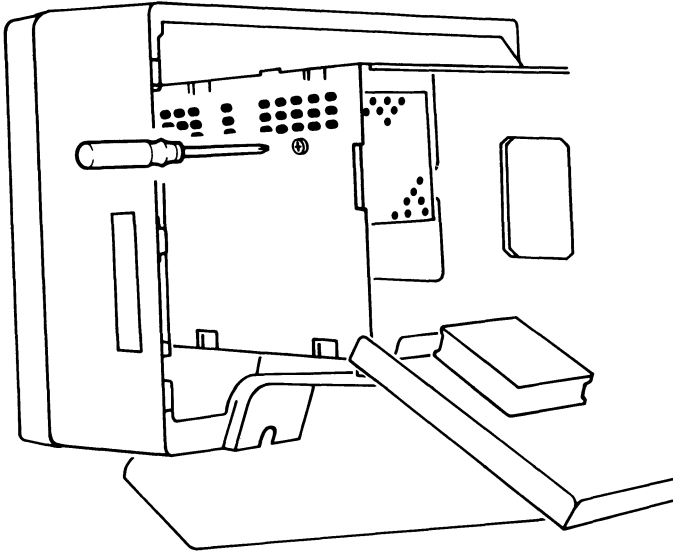


Figure 5-10. Power-Supply-Card Lockscrew

2. Remove the rear cover (S5510).
3. Open the safety cover (S5520).
4. Remove the power-supply-card lockscrew.

5. Press the fastening clip (at the top of the card) to the left, then hold the edge of the card and pull the card approximately halfway from its slot.

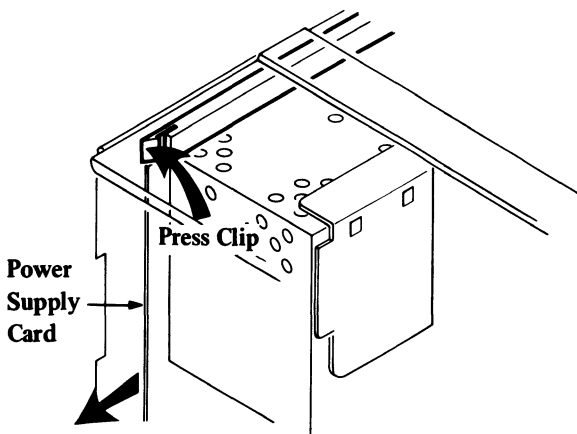


Figure 5-11. Power-Supply-Card Clip

6. Remove the EHT connector cable by using a wrench to turn the nut counterclockwise. Then pull out the nut and cable assembly to the right.

Note: On some displays the EHT connector cable to the power supply card may obstruct the removal of the primary power card. To remove this problem for future service calls, relocate the cable behind the wires to the primary power card.

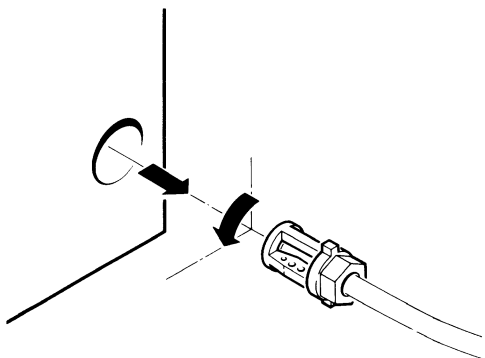


Figure 5-12. Removing the EHT Connector Cable

7. Unplug Xf (color display only), then Xg, Xi, Xd, Xu, and the black wire (connected to the primary power supply assembly) from P1 on the power supply card.

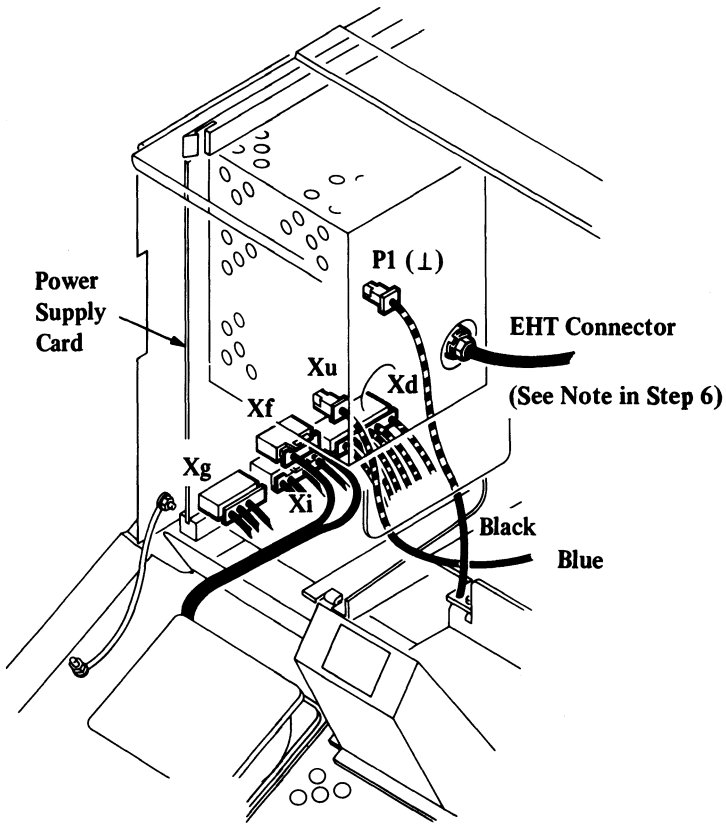


Figure 5-13. Display Power Supply Card, Unplugging Xf (Color Display Only), Xg, Xi, Xd, and Xu

8. Pull the power supply card until Xe is accessible, taking care not to put any strain on the wires at the rear of the card.
9. Unplug Xe.

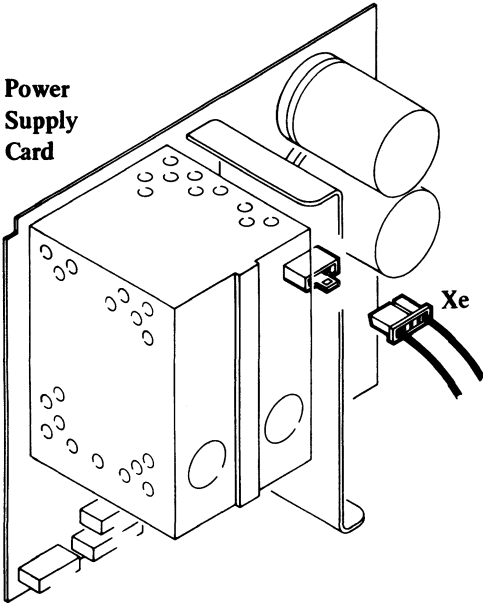


Figure 5-14. Display Power Supply Card, Unplugging Xe

10. Remove the card completely from the assembly and unplug Xp from the primary power card.

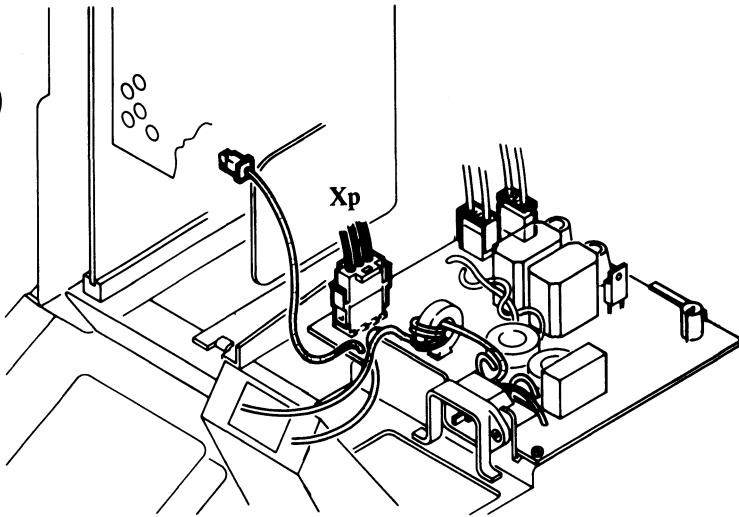


Figure 5-15. Primary Power Card, Unplugging Xp

Installing the Power Supply Card (S5545)

1. Install in the reverse sequence.

5379 Display Primary Power Assembly

Removing the 5379 Primary Power Card (Monochrome Display Only) (S5550-M01)

1. Read the warning notices and complete the instructions in (S5500).
2. Remove the rear cover (S5510).
3. Remove the primary-power-card lockscrew.

Note: The lockscrew is also the grounding-point for the ground braid from the CRT base card.

4. Remove the primary-power-card ground-wires (green/yellow) by removing the lockscrew.

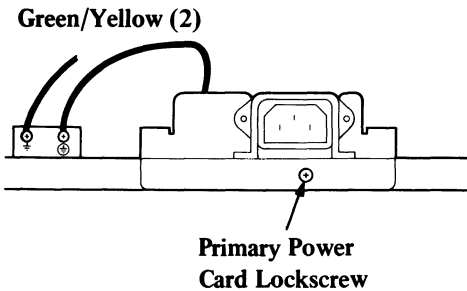


Figure 5-16. Monochrome Primary-Power-Card Lockscrew and Ground-Wires

5. Open the safety cover (S5520).
6. Disconnect Xp from the primary power card.
7. Disconnect P1(⌊) from the power supply card.
8. Withdraw the primary power card from the display.

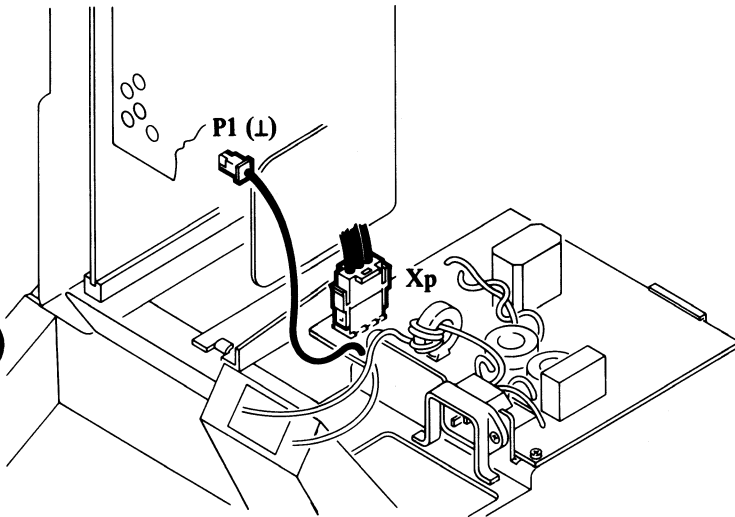


Figure 5-17. Disconnecting Xp and P1(⌊)

Removing the 5379 Primary Power Card (Color Display Only) (S5550-C01)

1. Read the warning notices and complete the instructions in **(S5500)**.
2. Remove the rear cover **(S5510)**.
3. Remove the five safety cover lockscrews (marked A, see Figure 5-5 on page 5-21).
4. Remove the safety cover by removing the screws (marked B, see Figure 5-6 on page 5-22) and lifting off the cover.

DANGER

Do not reconnect the primary power card mainline input connector when the safety cover is removed from the main assembly.

5. Disconnect the ground wire attaching the safety cover to the assembly.
6. Disconnect the fan by removing connector Xf from the power supply card, see (S5530).

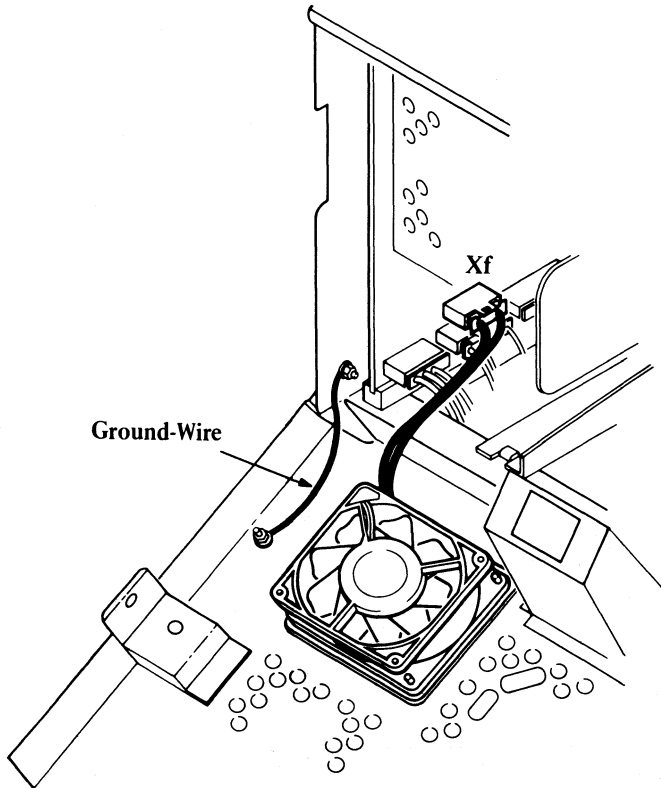


Figure 5-18. Safety Cover, Disconnecting the Ground-Wire and Xf

7. Remove the primary-power-card lockscrew, see Figure 5-19.
8. Remove the primary-power-card ground wire (A) by turning the ground-wire lockscrew counterclockwise to free the locknut.

Note: The safety ground wire and primary-power-card ground wire have the same color markings. When installing the new card **check** that each wire is connected to its correct point.

9. Remove the safety ground wire (B) by turning the safety ground-wire lockscrew counterclockwise to free the locknut. Remove the screw from the ground point and remove the starwasher and the ground wire.

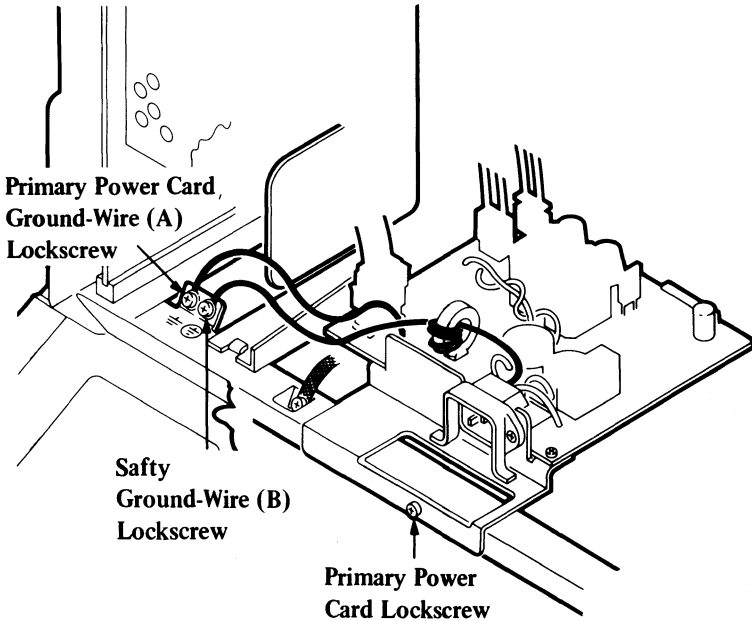


Figure 5-19. Primary-Power-Card Lockscrew and Ground-Wire Lockscrews

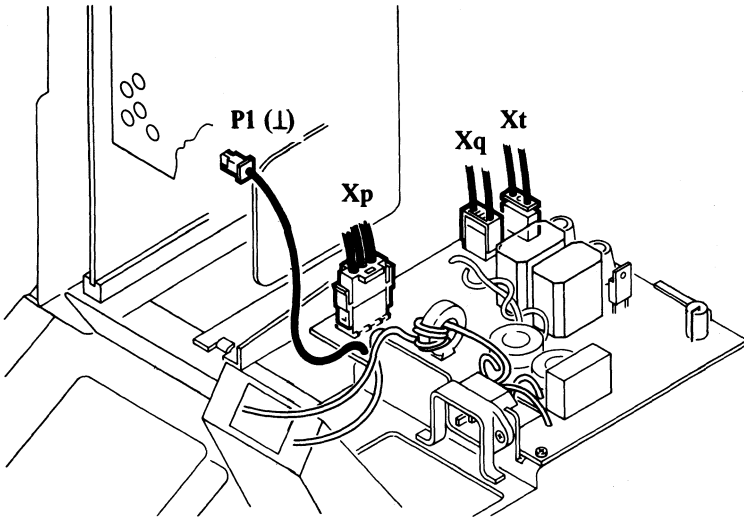


Figure 5-20. Primary-Power-Card Connectors

10. Disconnect P1 (L) from the power supply card.
11. To get access to the connectors Xp, Xq, and Xt near the rear of the card, lift the primary power card by its flange on the back of the card and pull it out from the display.
12. Disconnect Xp by compressing the fastening clips to unlock them, then pull the connector upward.
13. Disconnect Xq by releasing the fastening clip on the right-hand side of the connector, then pull the connector upward.

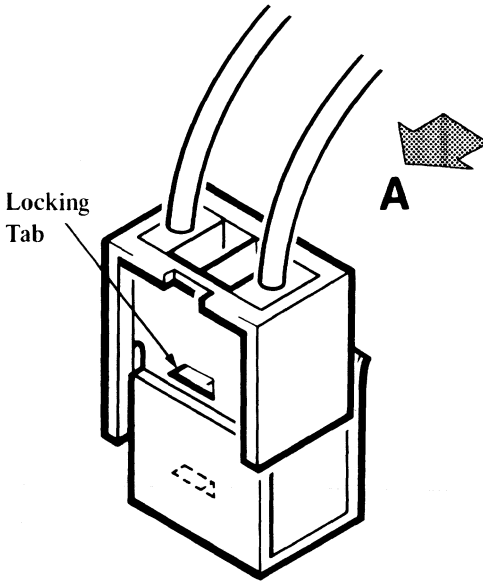


Figure 5-21. Unlocking Connector Xt

14. Disconnect Xt by holding the top of the connector with your thumb and forefinger. Press the top edge of the connector in the direction indicated at A (approximately 3 mm; 0.12 in.), to release the locktab.
15. Continue pressing the connector as directed in the previous step and pull the top half of the connector upward to remove it from its base.
16. Remove the primary power card from the display.

Installing the 5379 Primary Power Assembly (Color and Monochrome Displays) (S5555)

1. Install the primary power card (ensuring that the forward edge of the card is located in the card holder), in the reverse sequence.

Note: On some displays the EHT connector wire to the power supply card (see Removing the Power Supply Card (S5540)), may obstruct the removal of the primary power card. To remove this problem for future service calls, relocate the wire before installing the primary power card.

5379 Display Amplifier Video Card

Removing the 5379 Video Amplifier Card (Color Display Only) (S5560-C01)

1. Read the warning notices and complete the instructions in (S5500).
2. Remove the rear cover (S5510).
3. Open the safety cover (S5520).
4. Remove the four base-card-cover lockscrews.

Note: Screw A also secures the CRT base card and the CRT base-card-cover ground braids.

5. Remove the CRT base-card cover.

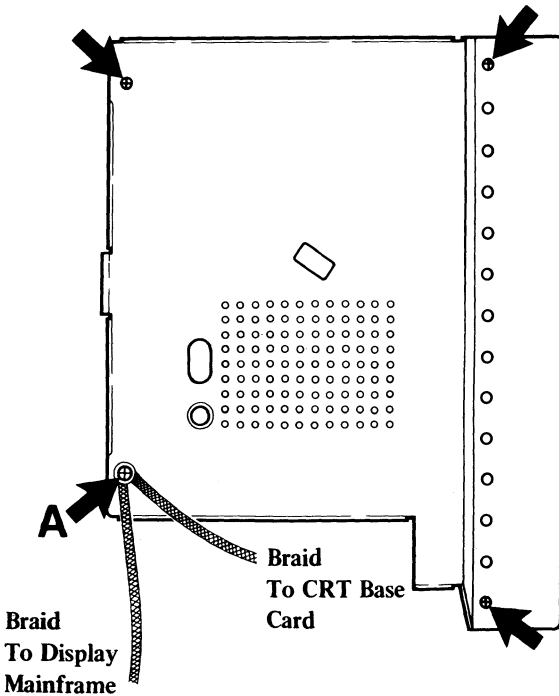


Figure 5-22. CRT Base Card Cover

6. Disconnect Xr, XR, the ground braid, XB, Xs, XG, and G1.
7. Disconnect Xa, Xb, and Xn.

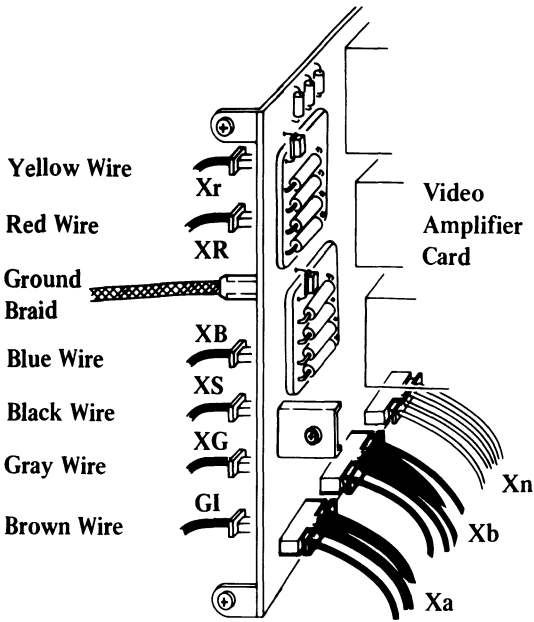


Figure 5-23. Video-Amplifier-Card Lockscrews and Connectors

8. Press to release the fastening clips at the top and bottom of the card, then pull out the video card from its slot until the video connectors at the rear of the card are visible.
9. Disconnect Input R, Input B, and Input G.

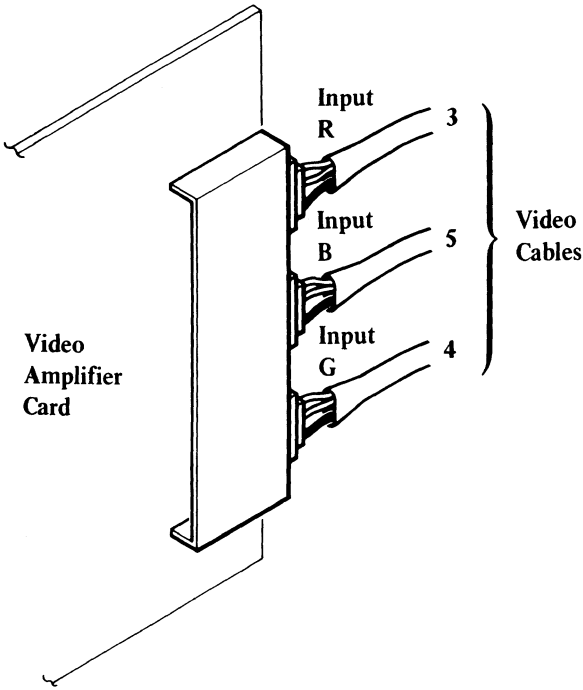


Figure 5-24. Color Video Connectors

Installing the 5379 Video Amplifier Card (Color Display Only) (S5565-C01)

1. If the video card has been exchanged for a new one, go to step 1 in the setup instructions on the next page.
2. If the video card has not been exchanged, go to step 2 in the setup instructions on the next page.
3. If the CRT base card, video amplifier card, and deflection card have been exchanged for new cards, read the notes preceding the setup instructions below.

5379 Color Display Video Amplifier Card Setup Instructions

Notes:

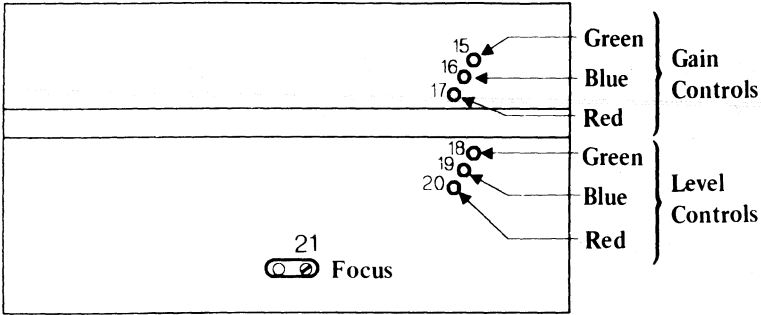
1. *Place the display so that the screen is directly facing you; then lock the tilt and swivel mechanism before making any adjustments.*
2. *If the CRT base card, video amplifier card, and deflection card have been exchanged for new ones, they should be set up in the following sequence:*
 - a. *CRT base card, see page 5-64.*
 - b. *video amplifier card, go to step 1 below, perform all the instructions, then return to here, Note 2c.*
 - c. *deflection card, see page 5-54.*

1. **Before inserting a new video card:**

Adjust the video amplifier level controls (18, 19, 20) fully counterclockwise.

Adjust the gain controls (15, 16, 17) fully clockwise; then rotate each control counterclockwise approximately one-third-of-a-turn.

Note: The total rotation of each control is approximately 320°.



Top View of Safety Cover

Figure 5-25. Color Display Video Card Controls

2. Install the video card into the mainframe, using the reverse sequence of the removal procedures, see **(S5560-C01)** on page 5-40, then continue with the next step.
3. Power on the work station in the correct sequence (system unit last).
4. Display the test pattern FC (raster only displayed) using the advanced diagnostics diskette (see Chapter 2, page 2-23).

5. Use a digital multimeter to measure the voltage between TP7 and a good ground point (for example, the safety cover).
6. Adjust the 5379 brightness control until the voltage reads -55 V. When the voltage is set, DO NOT READJUST THE BRIGHTNESS CONTROL.
7. Adjust the level controls one at a time (18, 19, 20), until a raster for each color just appears on the screen. The result that follows the adjustment of each control should be a gray raster that can only just be seen.
8. Display the test pattern FA (a white square is displayed) using the advanced diagnostics diskette (see Chapter 2, page 2-23).
If the color of the square is a light-gray or a blue tint, adjust the blue gain control (16) a very small amount clockwise to change the display to a white square.

Removing the 5379 Video Card (Monochrome Display Only) (S5560-M01)

1. Read the warning notices and complete the instructions in (S5500).
2. Remove the rear cover (S5510).
3. Open the safety cover (S5520).
4. Remove the four screws and remove the CRT base-card-cover.
5. Disconnect XG, Xr, G1, B, and the ground braid, from the video card.
6. Disconnect Xa, Xb, and Xn.
7. Disconnect Xw.

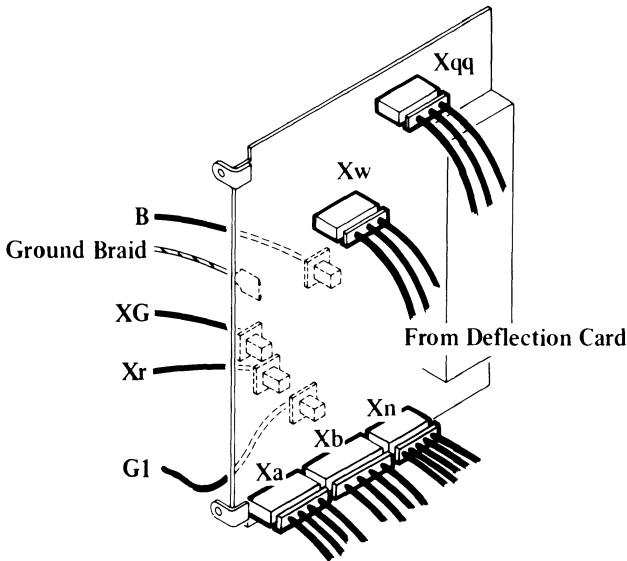


Figure 5-26. Monochrome Video Card Lockscrews and Connectors

8. Pull out the video card (approximately halfway) from its slot.
9. Disconnect Xqq.
10. Disconnect Input V.
11. Remove the video card.

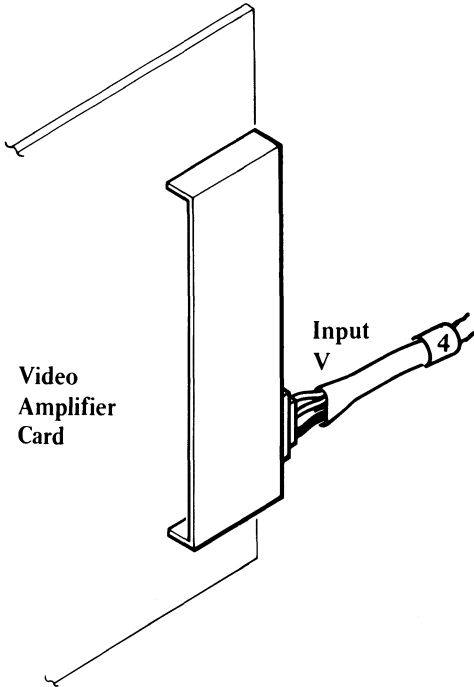


Figure 5-27. Monochrome Video Connector

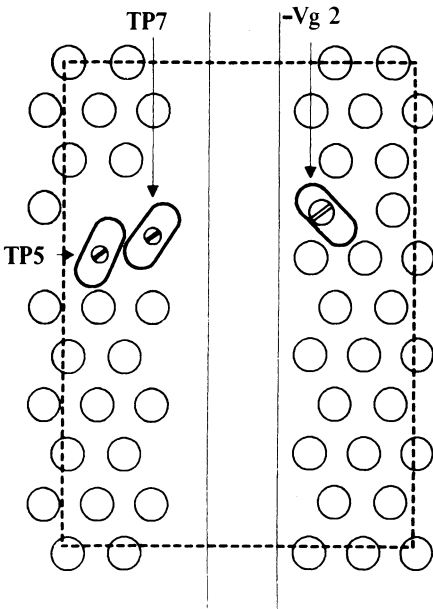
Installing the 5379 Display Video Card (Monochrome Only) (S5575-M01)

1. Install in the reverse sequence.
2. Perform the following adjustments.

5379 Monochrome Display Video Amplifier Card Setup Instructions

Note: Place the display so that the screen is directly facing you; then lock the tilt and swivel mechanism before making any adjustments.

1. Turn the video gain control ((15) on the video card) fully clockwise (see Figure 5-29 on page 5-49).
2. Use a digital multimeter to measure the voltage between TP7 and a good ground point (for example, the safety cover).

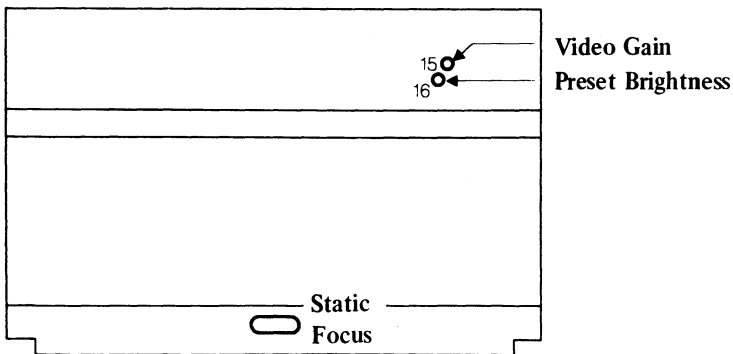


Rear View of Monochrome CRT Base Card

Figure 5-28. Test Points CRT Base Card (Monochrome Only)

3. Adjust the 5379 brightness control to the mid-position (adjust so the mark on the rear face of the control knob is aligned with the brightness-control symbol).

4. Display the test pattern FC using the advanced diagnostics diskette (see Chapter 2, page 2-23).
5. Adjust the preset brightness ((16) see Figure 5-29) until the voltage reads -3 V dc. When the voltage is set, **DO NOT READJUST THE BRIGHTNESS CONTROL.**
6. *Note.* This step should be completed in darkened conditions if possible reduce any external illumination. Slowly turn the $-Vg2$ control (22) on the CRT base card clockwise until the background raster just appears on the display.
7. Display the test pattern FA (a white square is displayed) using the advanced diagnostics diskette (see Chapter 2, page 2-23).
8. Turn the video gain control ((15) on the video card) counterclockwise until the background raster has only just disappeared from the screen.



Top View of Safety Cover

Figure 5-29. Monochrome Display Video Card Controls

9. Display the test pattern FD from the advanced diagnostics diskette (see Chapter 2, page 2-23).
10. Adjust the static focus control (30) for the best focus over all of the picture.

5379 Display Deflection Card

Removing the 5379 Display Deflection Card (S5580)

1. Read the warning notices and complete the instructions in (S5500).
2. Remove the rear cover (S5500).
3. Open the safety cover (S5500).
4. Remove the deflection card lockscrew.

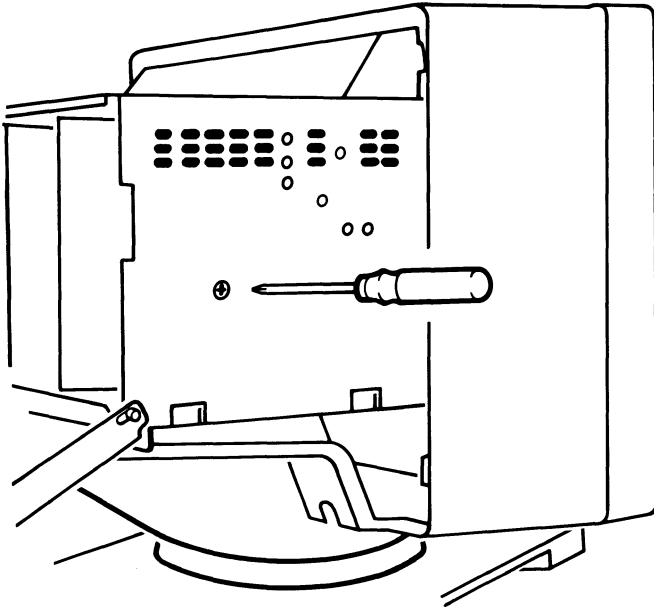


Figure 5-30. Deflection Card Lockscrew

5. Unplug connector Xz.

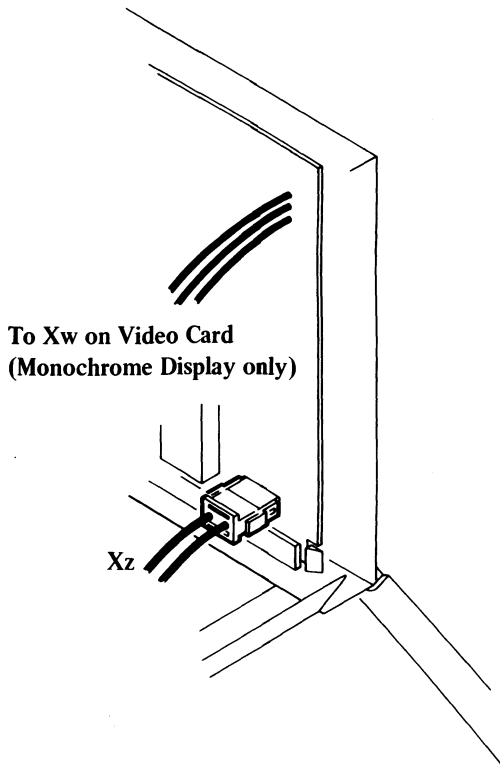


Figure 5-31. Deflection Card Connector Xz

- Press the fastening clip (at the bottom of the card) to the right, and pull the card approximately halfway from its slot.

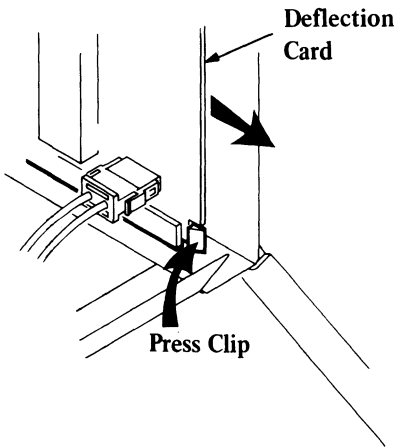


Figure 5-32. Deflection Card Fastening Clip

To X_{qq} on Video Card
(Monochrome Display only)

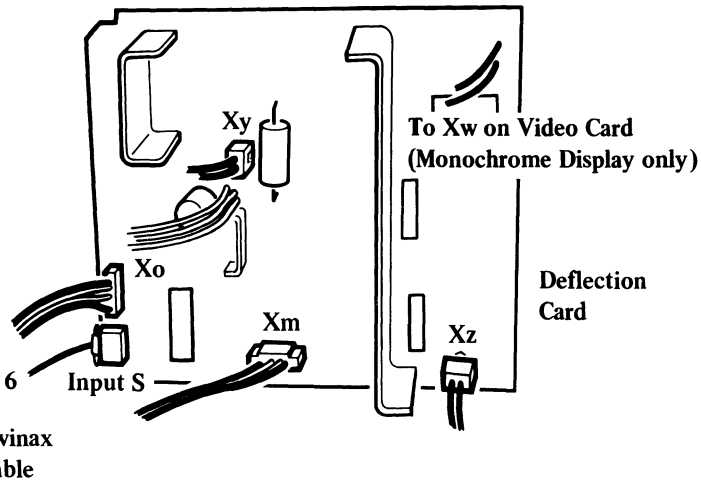


Figure 5-33. Deflection Card Connectors

7. Disconnect Xy by moving the flap (on the left-hand side of the lower-half of connector) to the left; then pull the top-half of the connector upward.
8. (Step 8 is for the monochrome display only.) Remove Xqq and Xw from the video amplifier card.
9. Disconnect Xm, Xo, and Input S connectors.
10. Remove the card.

Installing the 5379 Display Deflection Card (S5585)

1. If the CRT base card, video amplifier card, and deflection card have been exchanged for new cards, read the Notes preceding the setup instructions on the next page.
2. If you are installing the original or a new deflection card only, go to step 1 on page 5-55.

Display Deflection Card Setup Instructions

Checking the Screen Linearity

Notes:

1. *For the following procedures you will need a flexible, nonmetallic ruler that is 300 mm or 12 in. in length.*
 - *Place the ruler against the screen surface.*
 - *Move your head so that your eyes are aligned directly in front of any point at which a measurement is to be made (closing one eye when taking a measurement also increases the accuracy).*
2. *Place the display so that the screen is directly facing you; then lock the tilt and swivel mechanism before making any adjustments.*
3. *If the CRT base card, video amplifier card, and deflection card have been exchanged for new ones, they should be set up in the following sequence:*
 - a. *CRT base card, see page 5-64*
 - b. *video amplifier card, see page 5-43*
 - c. *deflection card, perform the procedures in the following steps.*

1. Install the deflection card into the mainframe.
2. Power on the work station in the correct sequence (system unit last).
3. Select the test pattern F4 (for color display) or test pattern F1 (for monochrome display) using the advanced diagnostics diskette (see Chapter 2, page 2-23).
4. Turn the vertical amplitude (height) control (13) fully counterclockwise.
5. Center the picture between the top and bottom edges of the bezel by adjusting the vertical shift control (10).

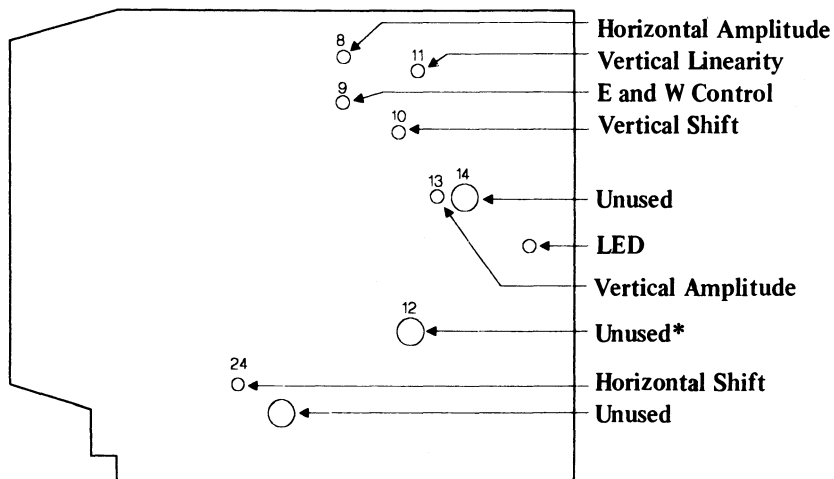


Figure 5-34. Deflection Card Controls

* See Notes on Page 5-57.

- Adjust the vertical amplitude (height) control (13) so that the distance between the top and bottom displayed lines is 275 mm (10.8 in.).

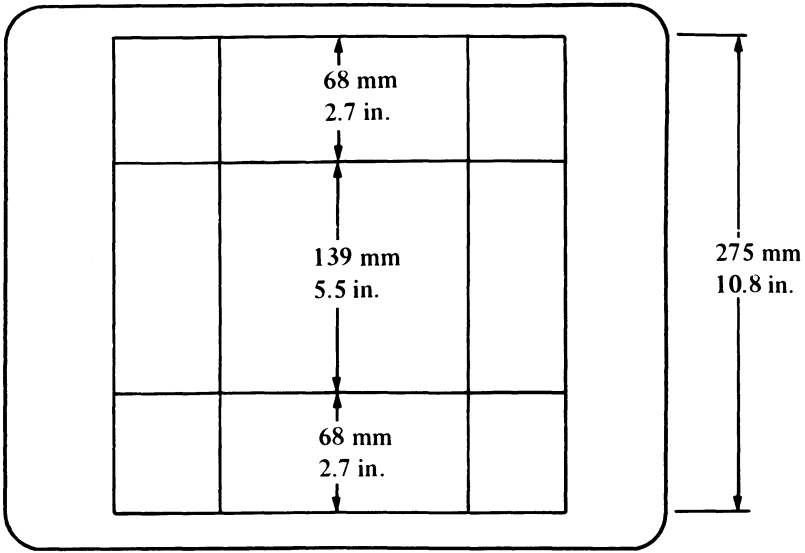


Figure 5-35. Screen Vertical Linearity Settings

- Carefully adjust the vertical linearity control (11) to obtain a measurement of 68 mm (2.7 in.) between the upper horizontal lines (as shown above).

Note: The adjustments in steps 5, 6, and 7 interact with each other. If the top and bottom image lines move behind the bezel or the picture is displaced too far from its vertical central position, repeat steps 5, 6, and 7.

Before continuing, it may be necessary to repeat steps 5, 6, and 7 several times so that all the conditions are met.

- Observe the screen from a central position and adjust the east-west pin-cushion control (9) to give a square picture with minimum distortion.

9. Adjust the horizontal amplitude (width) control (8), so that the distance between the left and right vertical lines is 275 mm (10.8 in.).

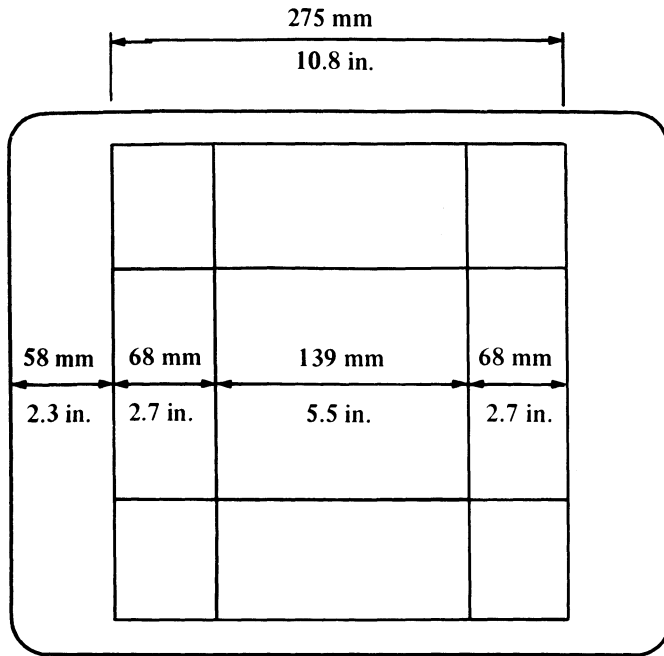


Figure 5-36. Screen Horizontal Linearity Settings

10. Adjust the horizontal shift control (24) so that the distance between the left-hand bezel edge and the left-hand vertical line is 58 mm (2.3 in.). See Notes below.

Notes:

It is possible that in step 10, the left-hand vertical line cannot be moved far enough to the right to permit a distance of 58 mm (2.3 in.). If this occurs, perform the following instructions, then return to step 10.

- a. *Adjust the brightness control until the background raster appears.*
- b. *Remove the plastic blanking-plug from the adjustment opening marked (12).*
- c. *Adjust (12) until the right-hand edge of the displayed image is approximately 1 mm (0.04 in.) from the right-hand edge of the raster.*
- d. *Install the plastic blanking-plug into the adjustment opening marked (12).*
- e. *Adjust the brightness until the background raster disappears.*
- f. *Adjust the east-west pin-cushion control (9) if necessary.*
- g. *Check all the above measurements again.*

5379 CRT Base Card

Removing the 5379 CRT Base Card (S5590)

1. Read the warning notices and complete the instructions in (S5500).
2. Remove the rear cover (S5510).
3. Open the safety cover (S5520).
4. Remove the CRT base card cover.

If you are repairing a 5379 M01 monochrome display, go to step 7.

If you are repairing a 5379 C01 color display, continue with step 5.

5. (Color display only.) Disconnect Xr, XR, the ground braid, XB, XS, XG, and G1 from the color video card.

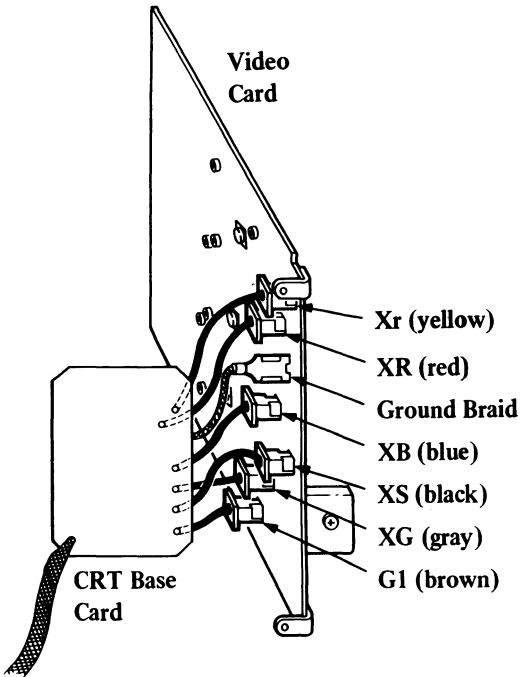


Figure 5-37. CRT Connections to Color Video Card

6. Go to step 8.

7. (Monochrome display only.) Disconnect the ground braid, B, XG, Xr, and G1 from the monochrome video card.

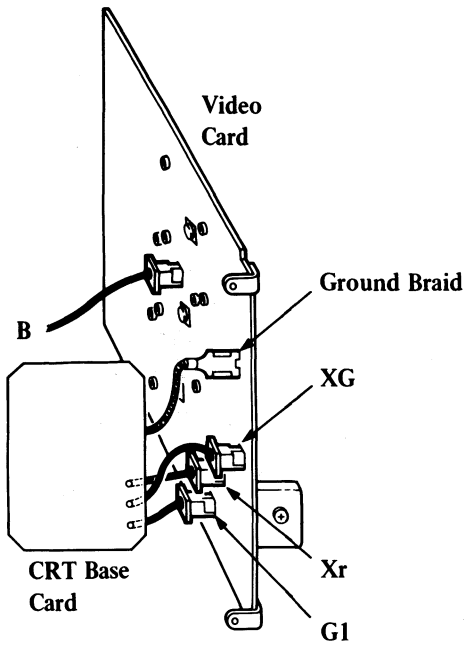


Figure 5-38. CRT Connections to Monochrome Video Card

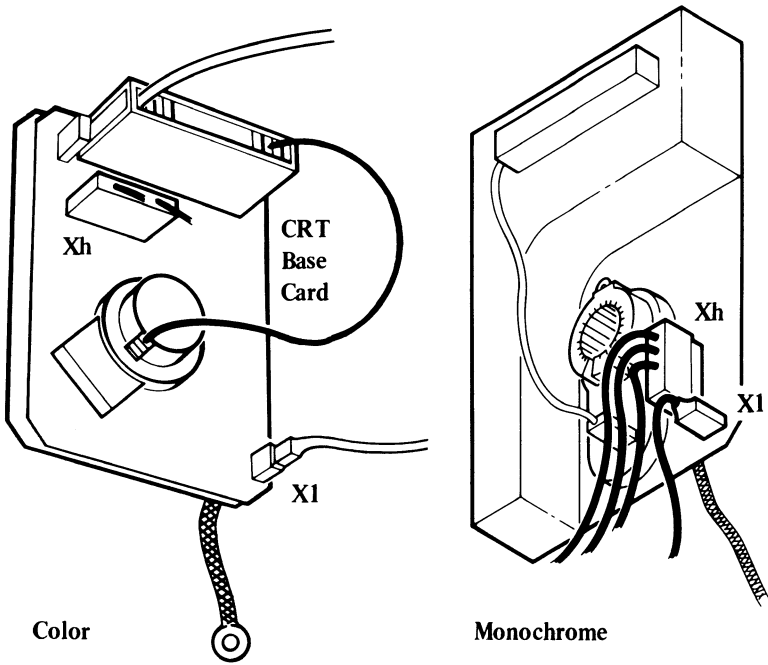
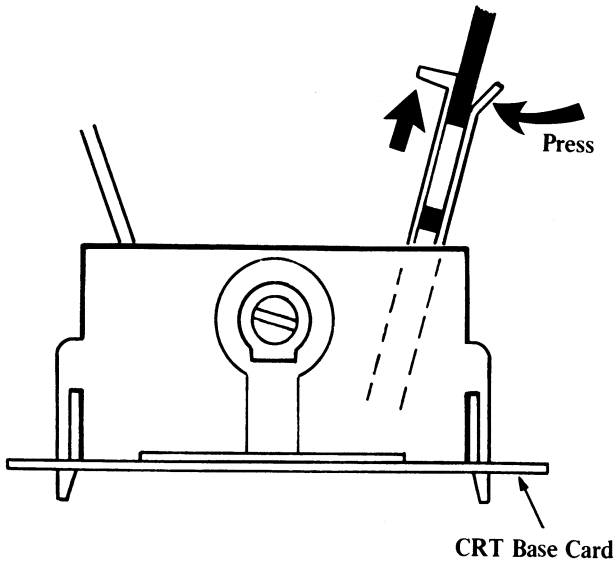


Figure 5-39. Unpluging the CRT Base Card

8. Unplug the card from the base of the CRT.
9. Unplug X1 from the base card.
10. Unplug Xh.

11. Remove the wire from the focus potentiometer by pressing the clips on the wire together (as shown below) and pulling the wire from the socket.
12. The CRT base card can now be removed from the display assembly.



Top View

Figure 5-40. Focus Potentiometer Wire Removal

Installing the CRT Base Card (S5595)

1. If the CRT base card has been exchanged for a new card go to step 1 on page 5-65.
2. If the CRT base card has not been exchanged for a new card go to step 2 on page 5-65.
3. If the CRT base card, video amplifier card, and deflection card have been exchanged for new cards, read the Notes in the setup instructions below.

CRT Base Card Setup Instructions

Monochrome CRT Base Card Setup Instructions

Go to the Monochrome Video Card Setup Instructions on page 5-48 and perform the instructions.

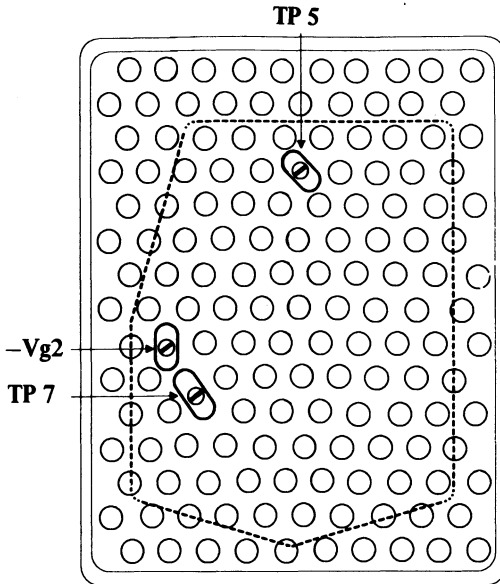
Color CRT Base Card Setup Instructions

Notes:

1. *Place the display so that the screen is directly facing you; then lock the tilt and swivel mechanism before making any adjustments.*
2. *If the CRT base card, video amplifier card, and deflection card have been exchanged for new ones they should be set up in the following sequence;*
 - a. *CRT base card, continue from step 1 below, complete the instructions then return here, to Note 2b.*
 - b. *video amplifier card, see page 5-43*
 - c. *deflection card see page 5-54.*

1. Before inserting the new CRT base card:

Adjust the $-V_{g2}$ control (22) fully counterclockwise.

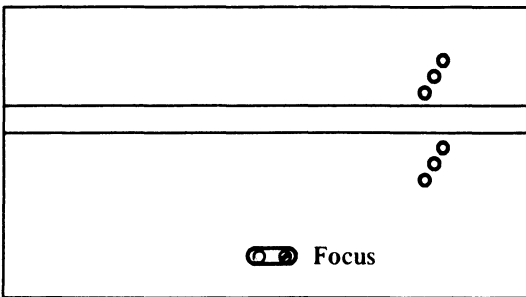


Rear View of Color CRT Base Card

Figure 5-41. Test Points, CRT Base Card (Color Only)

2. Install the CRT base card into the mainframe.
3. Power on the work station in the correct sequence (system unit last).
4. Display test pattern FC (no display, raster only) using the advanced diagnostics diskette (see Chapter 2, page 2-23).
5. Use a digital multimeter to measure the voltage between TP7 and a good ground point (for example, the safety cover).

6. Adjust the 5379 brightness control until the voltage reads -55 V. When the voltage is set, **DO NOT READJUST THE BRIGHTNESS CONTROL.**
7. Slowly turn the $-Vg2$ control (22) clockwise until the background raster just appears on the screen.
8. Display test pattern FD using the advanced diagnostics diskette (see Chapter 2, page 2-23) and check the focus of the display.
Adjust the focus control (21) to obtain the best possible image over the whole screen.



Top View of Safety Cover

Figure 5-42. Color Monitor Static Focus Control

5379 Display Controls Card

Removing the 5379 Display Controls Card (S5600)

1. Read the warning notices and complete the instructions in (S5500).
2. Remove the rear cover (S5510).
3. Open the safety cover (S5520).
4. Remove the power card (S5540).
5. Reach into the power supply unit opening as shown below to release the fastening clip at the lower end of the controls card, (it may be necessary to use a screwdriver as a lever to release the clip) and push the assembly outward from the main cover. See Figure 5-43 on page 5-68.

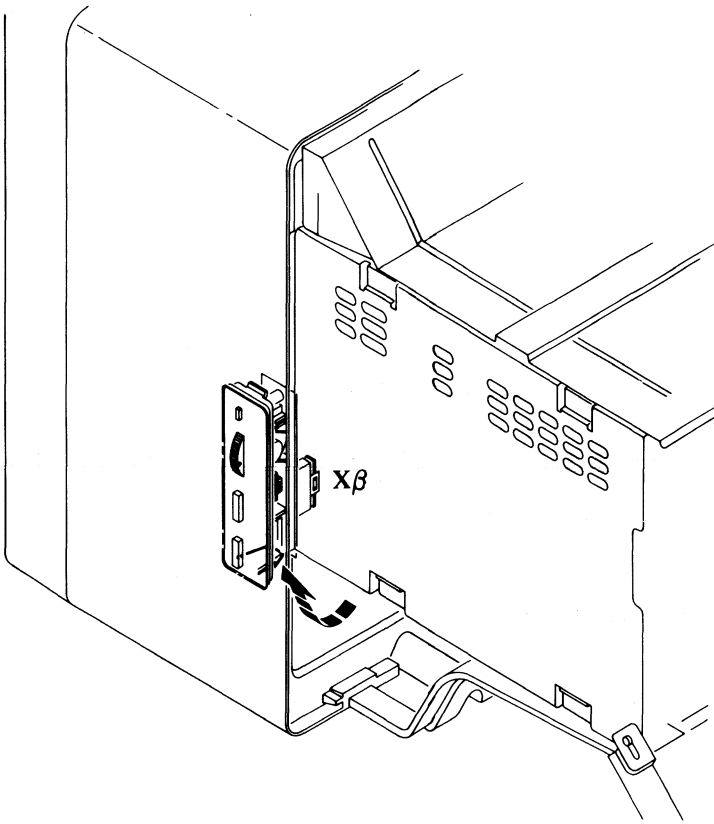


Figure 5-43. Releasing the 5379 Display Controls Card Clip

6. Unplug XB from the controls card.
7. Remove the display controls card.

Installing the 5379 Display Controls Card (S5605)

1. Install in the reverse sequence.

5379 Display Cables

5379 Display Video Cable(s)

Removing the 5379 Display Video Cable(s) (S5610)

1. Read the warning notices and complete the instructions in (S5500).
2. Remove the rear cover (S5510).
3. (Color display only.) Open the safety cover (S5520).
4. Remove the screws shown in Figure 5-44 and remove the top cover.
5. Remove the black wire from the left-hand side of the safety cage.

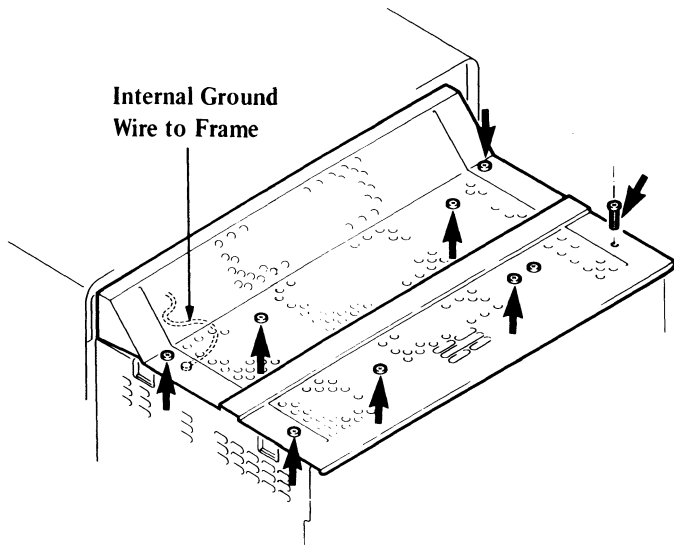


Figure 5-44. Safety Cage – Top Cover Lockscrews and Grounding Wire

6. Remove the CRT base card (S5590).
7. Remove the power supply card (S5540).
8. Unplug the connector (XB) on the display controls card (S5600).
9. Remove the deflection card (S5580).
10. (Color display only.) Remove the twin-ax cables 3, 4, and 5 from the video card. Unscrew the braided strap (that grounds the cables) from the base of the machine.
11. (Color display only.) Remove connectors DC1 and DC2 from the degauss coil (see Figure 5-58 on page 5-86).
12. (Monochrome display only.) Remove the twin-ax cable 4 from the video card. Unscrew the braided strip (that grounds the cable) from the base of the machine.
13. Close the rear safety cover, ensuring that no cables are trapped.
14. Remove the screws that fasten the metal cage to the covers as shown in Figure 5-45.

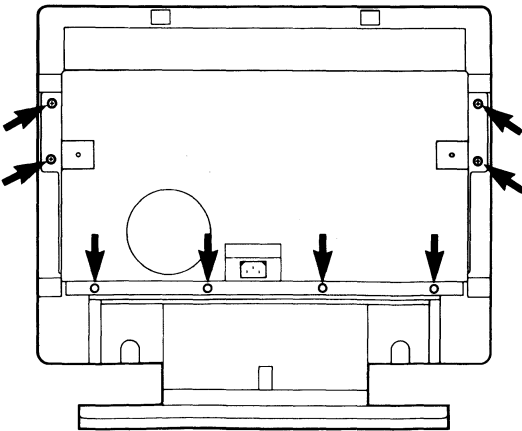


Figure 5-45. Safety Cover Lockscrews

15. Pull-out the cage from the display, ensuring that no cables are trapped.
16. Unplug the video cables from the rear panel of the display attachment unit.
17. **CAUTION**
The 5379 display weighs approximately 35 kg (75 lb); you will need aid in lifting the unit.

With the aid of another service representative, place the display face down so that it rests on the face of the CRT bezel.

18. Remove the two cable-channel lockscrews (marked A) and loosen the screw marked B.

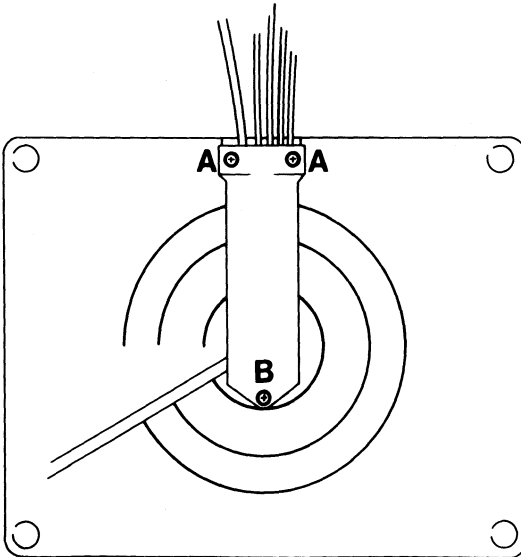


Figure 5-46. Display Tilt-and-Swivel Assembly, Cable-Channel

19. Rotate the cable-channel around screw B until the cable-entry opening is exposed.

20. Ease the plastic collars away from each end of the cable entry opening (this permits extra space for the connectors on the ends of the cables to pass through the opening).
21. Pull out the video cable(s) through the opening in the base of the display tilt-and-swivel assembly.

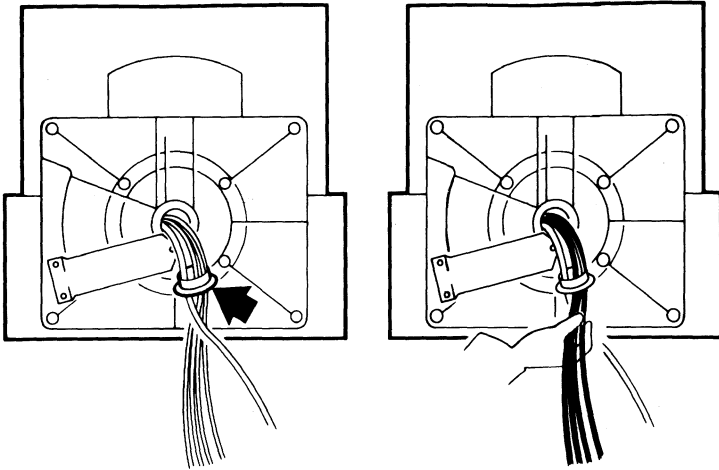


Figure 5-47. Removing the Video Cable(s)

Installing the 5379 Display Video Cable(s) (S5615)

1. Install in the reverse sequence.
2. Ensure that the spiral binding is positioned as near to the display as possible. If the heatshrink sleeving has been removed, secure the binding in position with a cable-tie.

5379 Display Power Cable

Removing the 5379 Power Cable (S5620)

1. Perform steps 1 through 20 in “Removing the 5379 Display Video Cable(s)” (S5610).
2. Pull out the power cable through the opening in the base of the display stand.

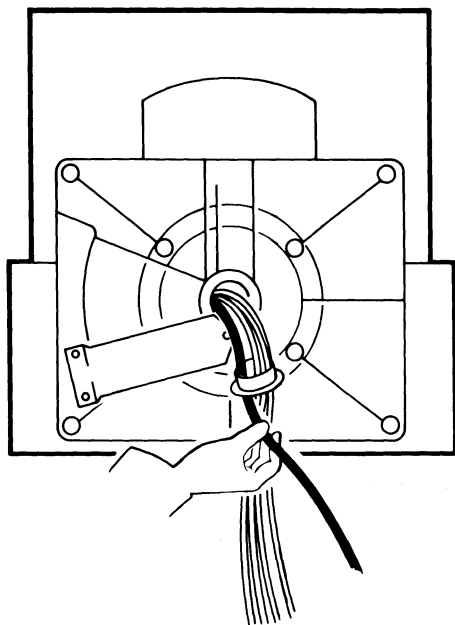


Figure 5-48. Removing the Power Cable

Installing the 5379 Power Cable (S5625)

1. Install in the reverse sequence.

5379 Display Cable Assembly

Removing the 5379 Display Cable Assembly (S5630)

1. Remove the safety cage by performing steps 1 through 18 in “Removing the 5379 Display Video Cables” (S5610).
2. Release the cable from the four clips.

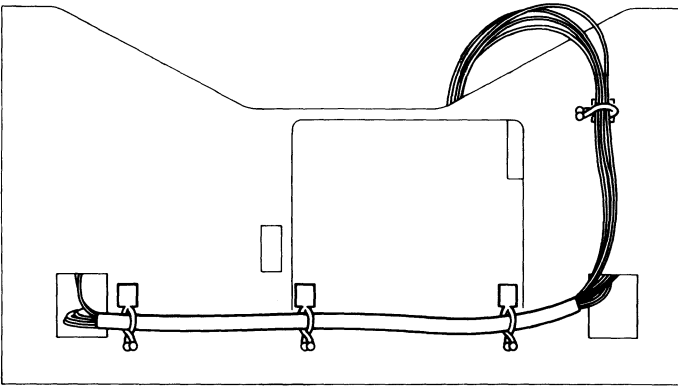


Figure 5-49. 5379 Display Cable Clips

3. Unplug connectors Xa and Xb from the video card.
4. Remove the cable.

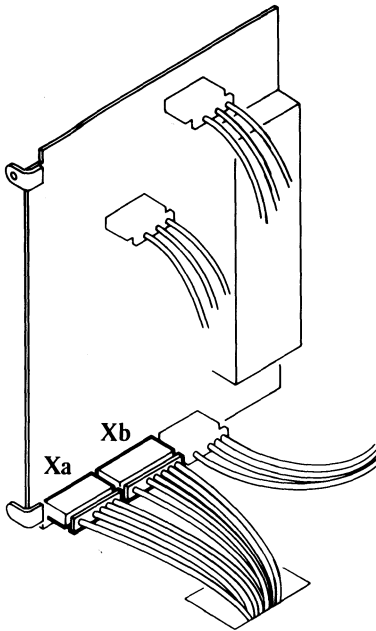


Figure 5-50. 5379 Display Cable Connections to Video Card

Installing the 5379 Cable Assembly (S5635)

1. Install in the reverse sequence.

5379 Display CRT/Bezel Assembly

Removing the 5379 Display CRT/Bezel Assembly (S5640)

Preparation

Warning:

1. Safety glasses must be worn when handling the CRT. Read the safety notices at the front of this manual.
2. Lock the display unit tilt-and-swivel assembly so that the screen faces away from you and the cables are nearest to you.

Notes:

1. *The replacement CRT/bezel assembly FRU includes a long-handled screwdriver. (This is needed for the removal of the old FRU.)*
2. *Ensure that there is enough work-space to separate the CRT/bezel assembly from the main body assembly.*
3. **CAUTION**
The 5379 display weighs approximately 35 kg (75 lb); you will need aid when moving the unit.

Place the new FRU on the work-surface next to the display as shown in Figure 5-51 on page 5-77. This permits the main body assembly to be lifted from the old FRU and inserted directly into the new one when the following procedures are complete.

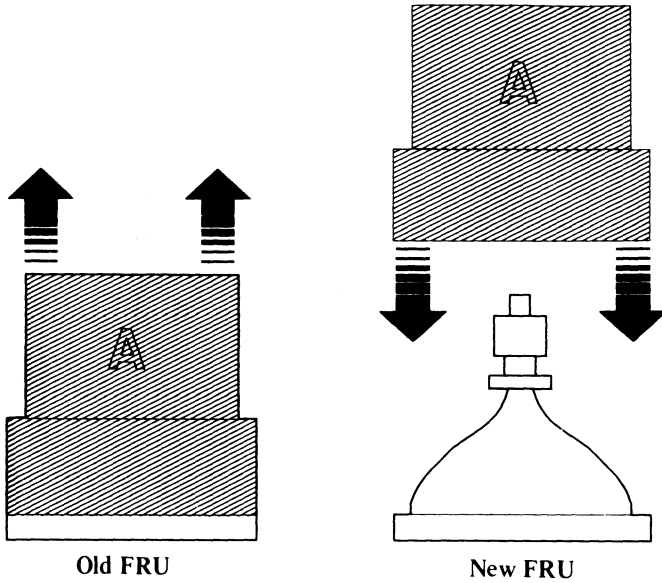


Figure 5-51. CRT/Bezel Assembly, Preparing to Install a new FRU

5379 CRT/Bezel Assembly

1. Perform the instructions in (S5500).
2. Disconnect the display from the DAU.
3. Remove the rear cover (S5510).
4. Open the safety cover (S5520).
5. Remove the screws shown in Figure 5-52 on page 5-78 and remove the top cover.
6. Remove the black wire from the left-hand side of the safety cage.

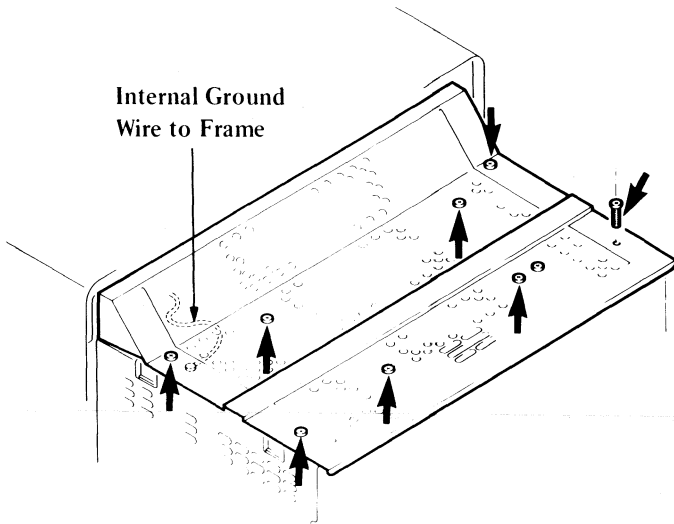


Figure 5-52. Safety Cage – Top Cover Lockscrews and Grounding Wire

7. Remove connectors Xy, (see page 5-53) and Xz from the deflection amplifier card (see page 5-51). (When installing Xy, ensure that the connector key locates with the slot in the flap.)
For a 5379 color display continue with step 8.
For a 5379 monochrome display continue with step 10.
8. Remove connectors DC1 and DC2 from the degauss coils on the CRT (see Figure 5-58 on page 5-86). It may be necessary to partly remove the deflection card to get access to these connectors.
9. Remove the CRT base card cover.
10. Remove the CRT base card from the CRT (see page 5-62).
11. Review Figure 5-39 on page 5-62; remove connector Xl, then remove the wire from the focus control by pressing the clips on the wire together (see Figure 5-40 on page 5-63) and pulling the wire from the socket.

12. Remove the fastening screw from the power supply card and slide the card approximately half-way out from the main assembly.
13. Remove the EHT connector and the wire Xu from the power supply card (see page 5-29) and slide the card back into place. Close the safety cover and fasten with one of the safety cover lockscrews.
14. With the aid of another service representative place the display face down so that it rests on the face of the CRT bezel.
15. Using the screwdriver supplied with the new CRT assembly, loosen the 8 screws, around the outside of the cover, that fasten the cover to the CRT bezel. (It should not be necessary to remove the screws from their holes.)

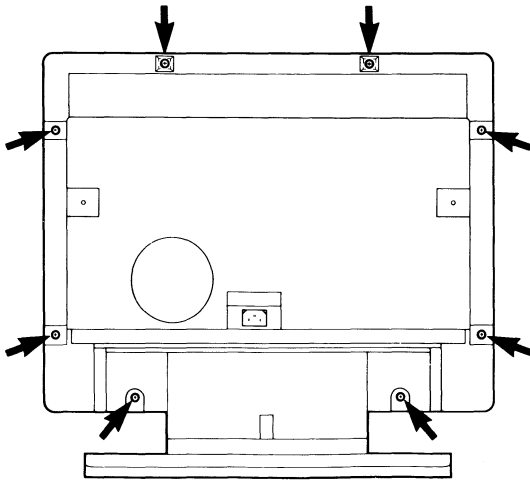


Figure 5-53. Main Cover to CRT Bezel Lockscrews

16. Place the display so that the tilt-and-swivel assembly is toward you as shown in Figure 5-54.

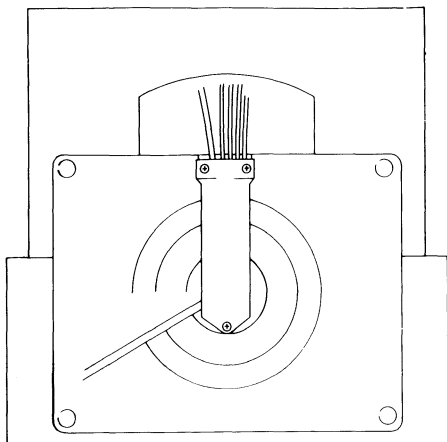


Figure 5-54. Underside of Cover and Tilt-and-Swivel Assembly

17. CAUTION

The neck of the CRT is easily broken, care must be taken when removing the main assembly.

Note: Do not hold the assembly by the tilt-and-swivel base; it may rotate although the mechanism is locked.

With the aid of another service representative separate the machine from the CRT/bezel assembly by lifting the outer cover and tilt/swivel assembly so that the CRT/bezel remains.

Monochrome Display Only. Go to step 21.

Color Display Only. Continue with step 18.

18. Color Display Only.

Place the cage assembly on a flat, clean, surface.

19. Remove the degauss coil ((S5660) steps 13 through 17 only).

20. Reinstall the degauss coil to the new CRT/bezel assembly in the reverse sequence (**use (S5660) steps 17 through 13 only**).
21. Lower the remainder of the machine onto the new CRT/bezel assembly taking care not to damage, trap, or pinch any wiring.
22. Tighten the 8 bezel-to-cover fastening screws.
23. Reconnect all wires in reverse sequence.

Installing the 5379 Display CRT/Bezel Assembly (S5645)

1. Install in the reverse sequence.
2. Monochrome Display Only

Go to the Monochrome Video Card Setup Instructions on page 5-48 and perform the instructions.

3. Color Display Only

Perform CRT setup adjustments (from step 3 only), see page 5-65.

5379 Display Cover and Tilt-and-Swivel Assembly

Removing the Cover and Tilt-and-Swivel Assembly (S5650)

Note: The replacement tilt-and-swivel assembly FRU includes a long-handled screwdriver. This is needed for the removal of the old FRU.

1. Perform the CRT/bezel removal procedures (S5640).
2. Remove the four safety-frame-to-cover lockscrews.

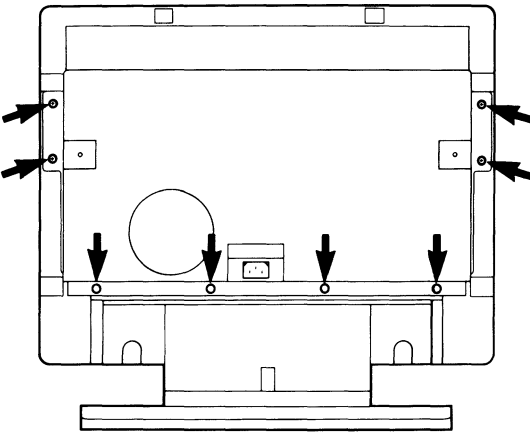


Figure 5-55. Safety-Frame-to-Cover Lockscrews

3. Disconnect the video cables from the rear of the DAU.

4. Remove the cable-channel fastening screws (marked A) and loosen the lock screw (marked B).

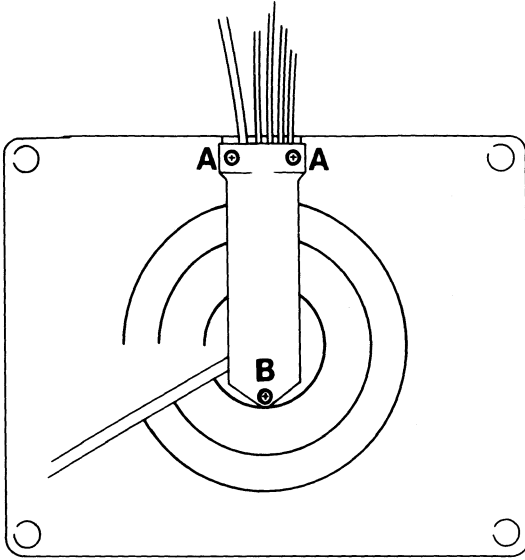


Figure 5-56. Cover and Tilt-and-Swivel Assembly Cable-Channel Lockscrews

5. Pull out the power and video cables through the opening in the base of the display stand.

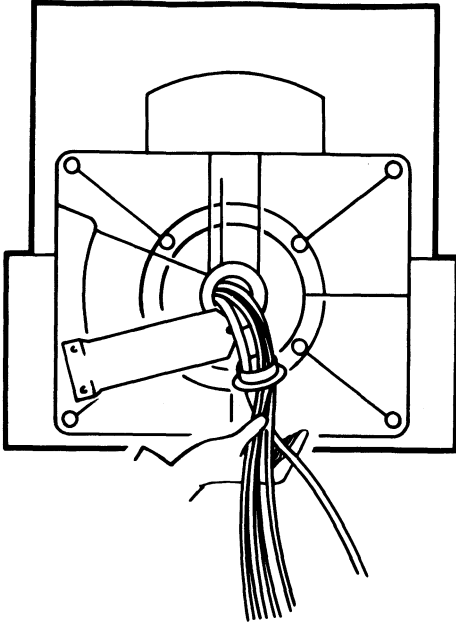


Figure 5-57. Removing the Power and Video Cables

Installing the Cover and Stand Assembly (S5655)

1. Install in the reverse sequence.

5379 Display Degauss Coil Assembly (Color Display Only)

Removing the 5379 Color Display Degauss Coil Assembly (S5660)

1. Read the warning notices and complete the instructions in (S5500).
2. Remove the rear cover (S5510).
3. Open the safety cover (S5520).
4. Remove the screws and the top cover from the safety cage.
5. Remove the black wire from the left-hand side of the safety cage.
6. Remove the CRT base card (S5590).
7. Remove the display controls card (S5600).
8. Remove the deflection card (S5580).
9. Remove the twin-ax cables 3, 4, and 5 from the video card. Unscrew the braided strip from the base of the machine.

10. Remove connectors DC1 and DC2 from the degauss coil.

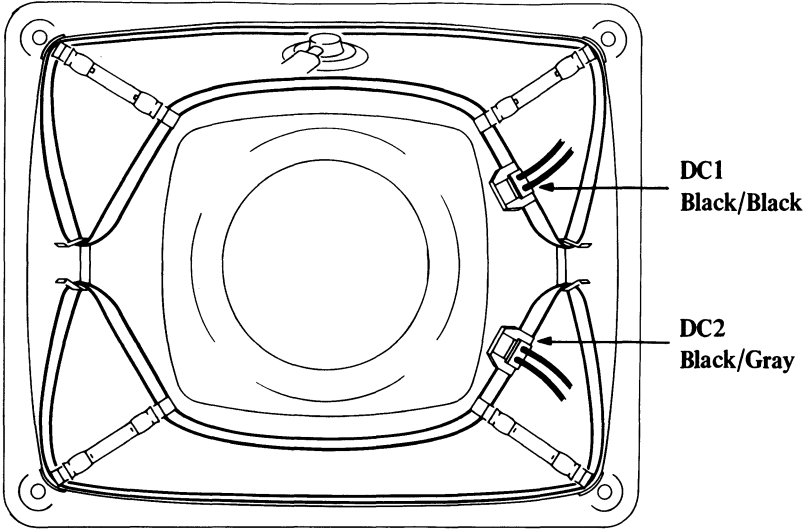


Figure 5-58. Degauss Coil Connectors DC1 and DC2

11. Close the rear safety cover, ensuring that no cables are trapped.

12. Remove the screws that fasten the cage to the cover as shown in Figure 5-59.

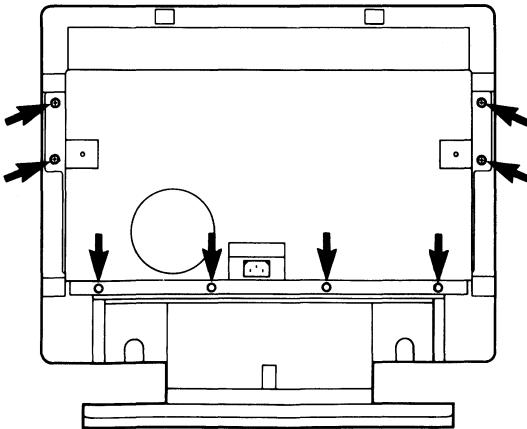


Figure 5-59. Safety Frame Lockscrews

13. Pull out the cage from the display, ensuring that no cables are trapped.
14. Remove the EHT connector cable from the clips.

To EHT Connector on the
Power Supply Card

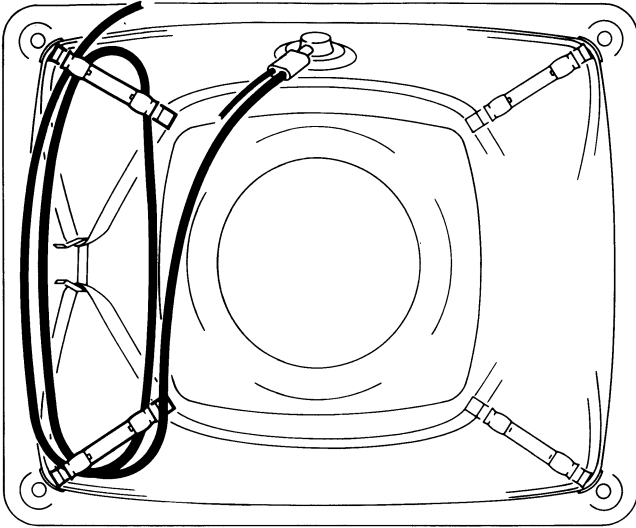


Figure 5-60. EHT-Connector Cable Fastening Clips

15. Release the degauss coil from points A.
16. Release the degauss coil from points B.

17. Remove the degauss coil from the clips.

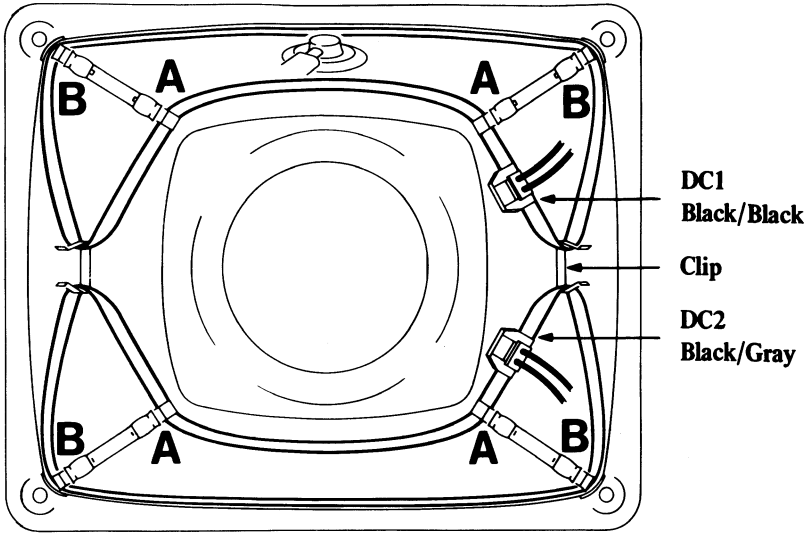


Figure 5-61. Degauss Coil Fastening Clips

18. Remove the CRT grounding wire from the clips.

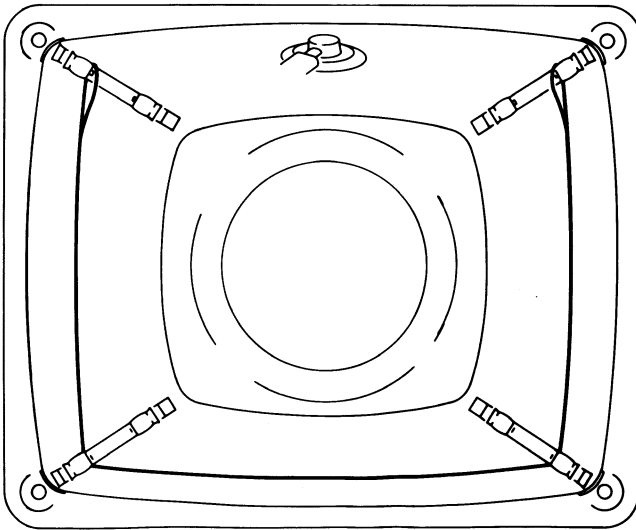


Figure 5-62. CRT Grounding Wire and Fastening Clips

Installing the 5379 Display Degauss Coil Assembly (S5665)

1. Install in the reverse sequence.

Note: Ensure that the connectors DC1 (two black wires) and DC2 (black and gray wires) are in their correct positions (see Figure 5-61).

5379 Display Balance Setup Instructions (S5690)

Notes:

1. *Place the display so that the screen is directly facing you, then lock the tilt-and-swivel mechanism before making any adjustments.*
2. *If a new CRT base card, video amplifier card, and deflection card have been installed they should be set up in the following sequence:*
 - a. *CRT base card, see page 5-64*
 - b. *video amplifier card, see page 5-43*
 - c. *deflection card, see page 5-54.*

5378 Display Attachment Unit (S5700)

Warning: The power-off (system unit first) and power-on (system unit last) sequences must be observed at all times (see Chapter 1, page 1-18).

Preparation

1. Prepare a clean, flat work-surface before starting the following procedures.

Warning: Always protect the work-surface from damage when moving the DAU.

Note: Only the necessary detail is shown in the figure. Do not disconnect any cables unless instructed to do so in the procedures.

2. Remove any units that may be on top of, or obstructing access to, the DAU.

CAUTION

The 5379 display weighs approximately 35 kg (75 lb); you will need aid when moving the unit.

3. Place the DAU near the edge of the work-surface, leaving enough clearance in front of the unit for its cover to be removed.

5378 Display Attachment Unit Cover

Removing the DAU Cover (S5710)

1. Power off the work station (system unit first) see Chapter 1, page 1-17.
2. Remove the three hexagon-socket screws (using a 3-mm hexagon wrench IBM part 1749238) from the rear of the DAU.

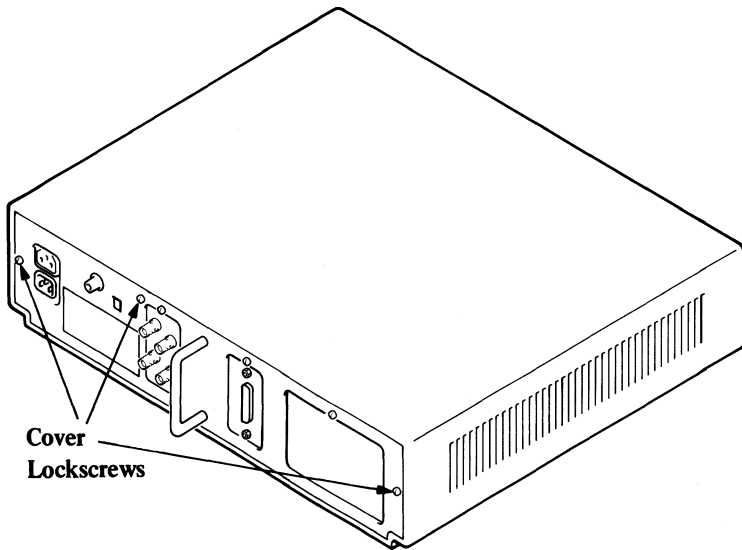


Figure 5-63. 5378 Display Attachment Unit, Cover Lockscrews

3. Hold tightly to the handle at the rear of the DAU.
4. With the other hand, hold the front of the cover, then tilt the DAU by lifting the front of the unit.
5. Pull the cover forward and remove it from the DAU assembly.

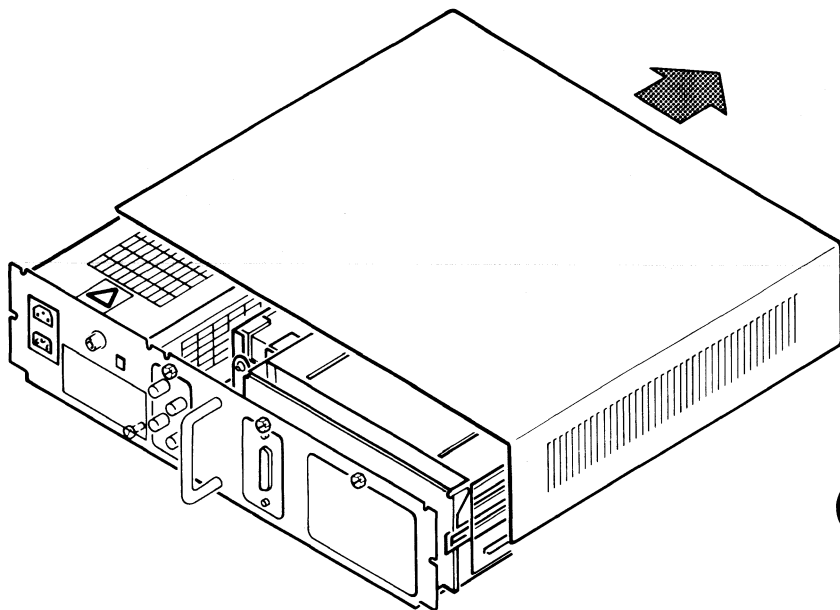


Figure 5-64. Removing the DAU Cover

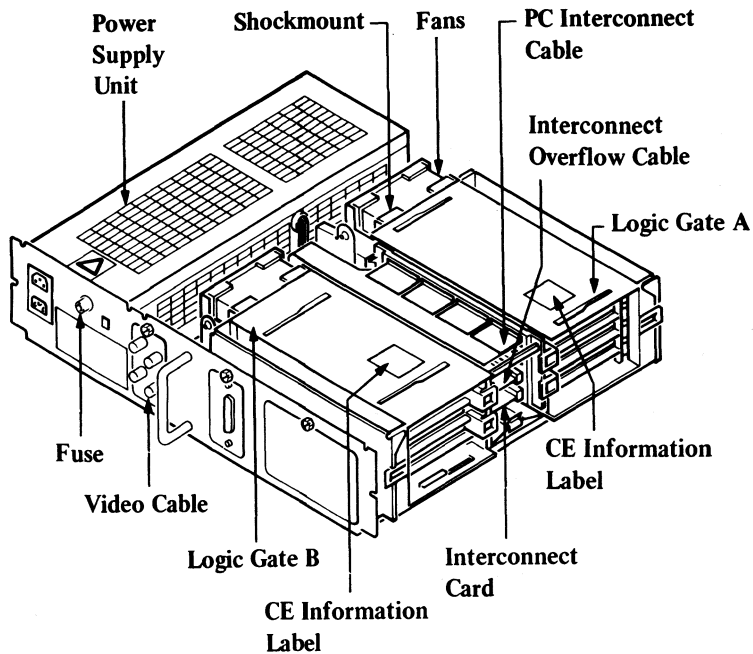


Figure 5-65. DAU with Cover Removed

Installing the DAU Cover (S5715)

1. Install in the reverse sequence.
2. Power on the work station (system unit last), see Chapter 1, page 1-18.

DAU Power Supply

Removing the DAU Power Supply Unit (S5720)

DANGER

Switch off the power and remove the mainline power supply cable from the mainline power outlet.

The power supply unit may be hot; do not touch it until it has cooled.

1. Remove the DAU cover (S5700).

The DAU power supply unit is located on the right-hand side of the assembly.

2. Disconnect the two power cables P1 and P2 from the sockets J1 and J2 at the rear of the power supply unit.

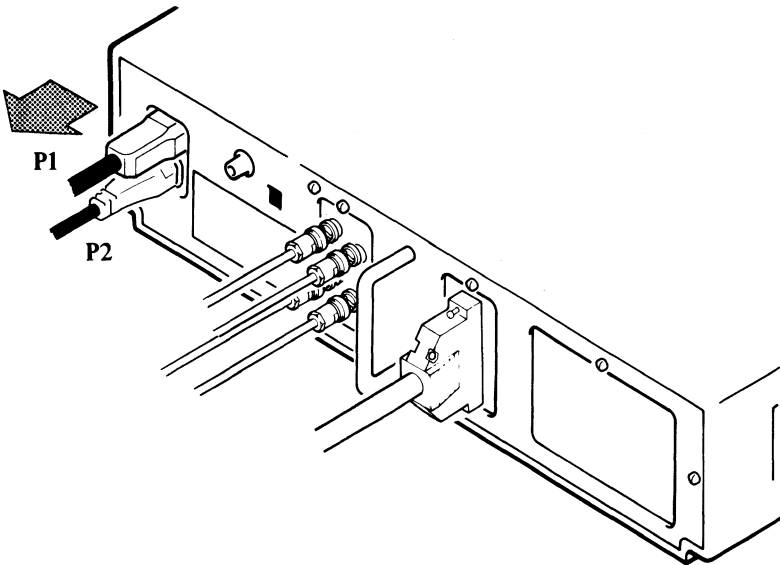


Figure 5-66. Power Cables P1 and P2

3. Remove the plastic cable-retainer, then disconnect the video cable connector from B1A2, B1A3.
4. Remove the plastic cable-retainer, then disconnect the PC flexi-interconnect cable from logic gate A.
5. Disconnect the logic power cable by unplugging connector J3 from the interconnect card.

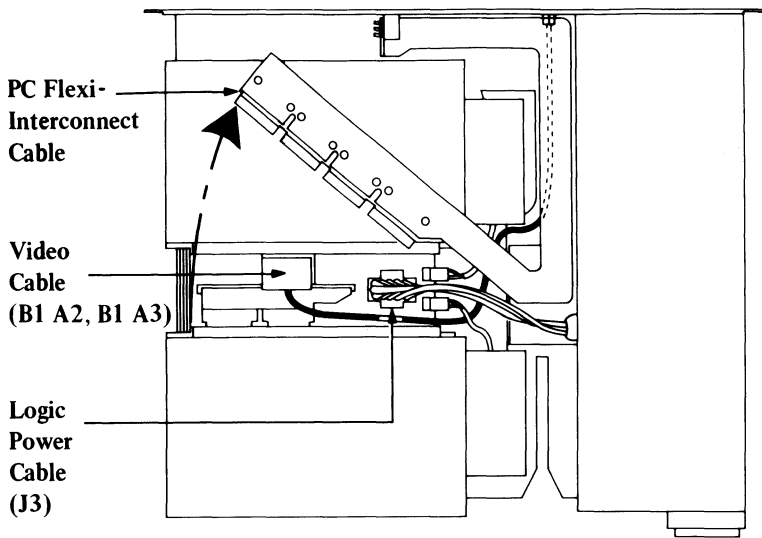


Figure 5-67. Interconnect-Card Connections

6. Remove the grounding screw from the rear of the power supply unit.

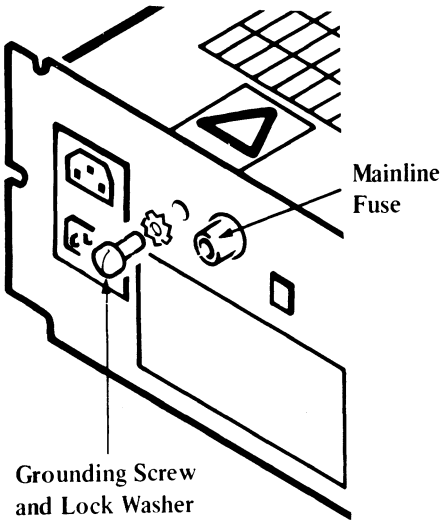


Figure 5-68. Power Supply Unit to Rear Panel Grounding Screw

7. Loosen (but do not remove) the power supply unit lockscrew.

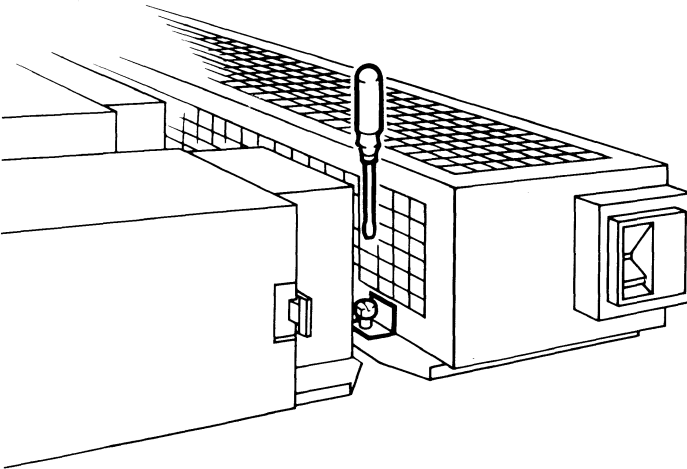


Figure 5-69. 5378 Power Supply Unit Lockscrew

8. Ensure that all loose cables are free of the power supply unit.
9. Hold the power supply unit tightly with one hand, and hold the main DAU frame with the other. Then (taking care not to damage the fuseholder at the rear of the power supply unit) pull the unit toward you to release it from its mounting lugs. Lift the power supply unit free of the DAU assembly.

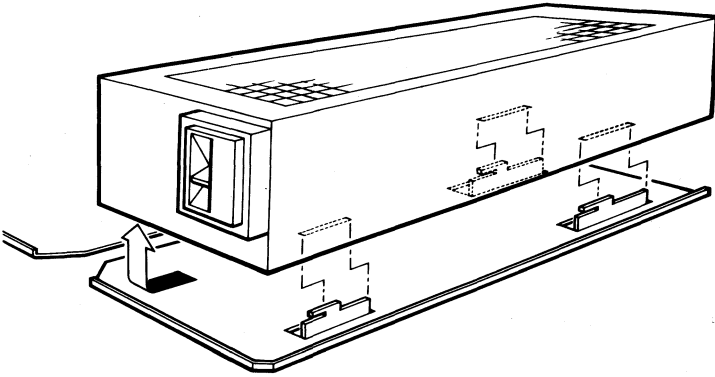


Figure 5-70. Removing the Power Supply Unit

Installing the DAU Power Supply Unit (S5725)

1. Check that the power-supply voltage-selection switch is set to the correct voltage.
2. Install in the reverse sequence.

5378 DAU Mainline Fuse

Removing the DAU Mainline Fuse (S5730)

DANGER

Switch off the power and remove the mainline power cable from the power supply outlet before removing the fuse. Always use a fuse of the correct type and rating.

1. Find the location of the mainline fuse (6 amps) in the rear of the power supply unit (see the Figure below).
2. To remove the fuse, push in and turn the fuseholder-cap counterclockwise a quarter-turn with a screwdriver, then pull the fuse away from the fuseholder.

Installing the DAU Mainline Fuse (S5735)

1. Install in the reverse sequence to removal, ensuring that the screw shown below is tightly fastened to give a good ground.

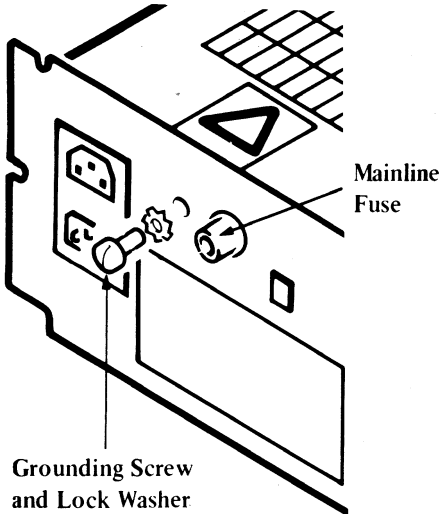


Figure 5-71. DAU Mainline Fuse Location

5378 DAU Fan

Removing the 5378 DAU Fan (S5740)

1. Remove the DAU cover (S5710).
2. Unplug connector PX1 if fan A is to be removed.
3. Unplug connector PX2 if fan B is to be removed.

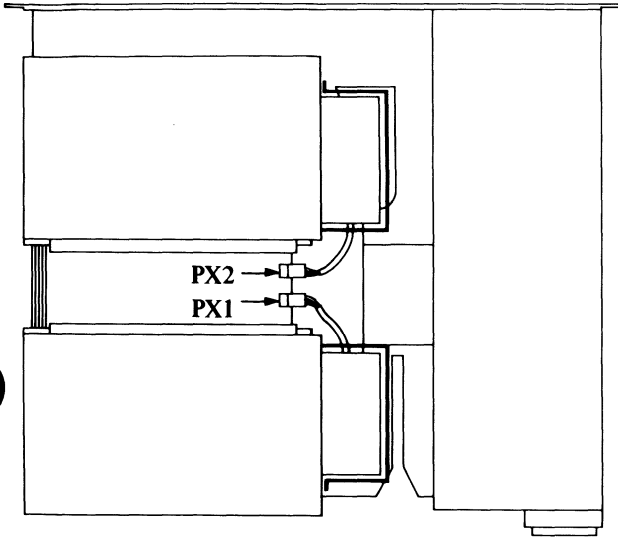


Figure 5-72. Fans and Fan Connectors

4. Remove the shockmount from the top of the fan.
5. Lift the fan vertically to remove it from its holder.

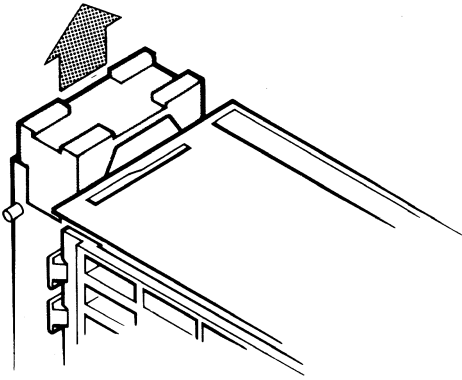


Figure 5-73. Removing the Fan Shockmount

Installing the DAU Fan (S5745)

1. Install the fan in its holder.

CAUTION

The fan must be installed so that it blows air from the logic cards to the power supply unit. Check that the airflow direction arrows on the outer molding of the fan are pointing in the same directions as shown in the figure below.

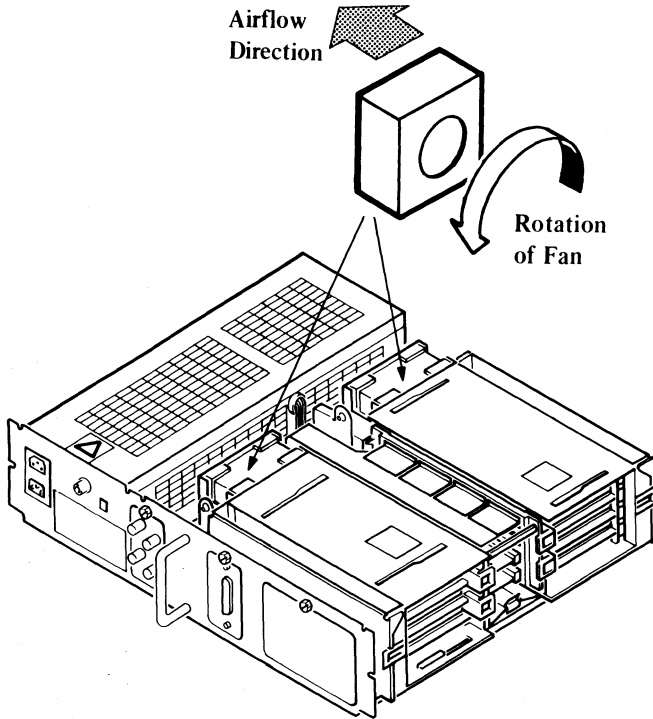


Figure 5-74. Installing the Fan

2. Install the shockmount on the top of the fan.
3. Reconnect PX1 if fan A has been installed, or reconnect PX2 if fan B has been installed.
4. Install the DAU in its cover.

5378 DAU Logic Cards

Removing the 5378 DAU Logic Cards (S5750)

1. Remove the DAU cover (S5710).

CAUTION

For the next step, check that the support-stay is locked in position; if not, the gate may fall and damage components.

2. Unlock the logic gate by pressing the locking catch in the direction shown in the figure below, then, using the central lifting bar, lift and swing the logic gate into the vertical position and support it with the support-stay.

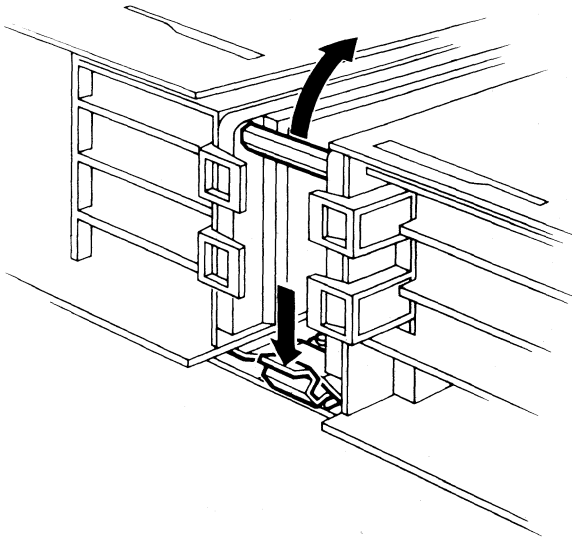


Figure 5-75. Locking Catch

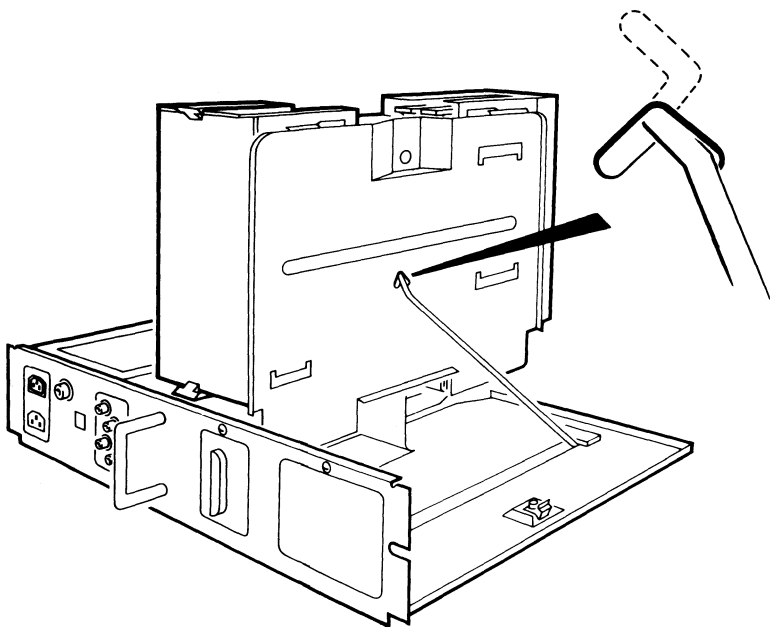


Figure 5-76. Logic Gate in Vertical Position

To remove a card from the logic gate:

3. Identify the card in either gate A1 or gate B1.
4. Release the catch and swing open the card cover.

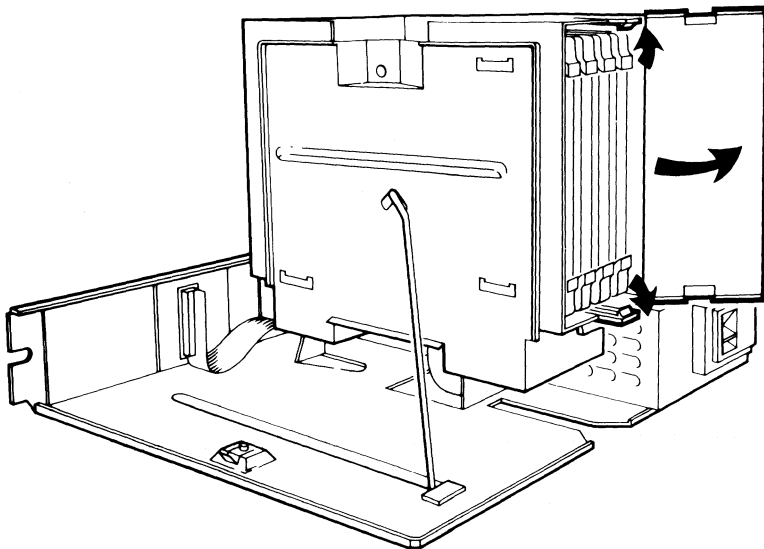


Figure 5-77. Card Cover

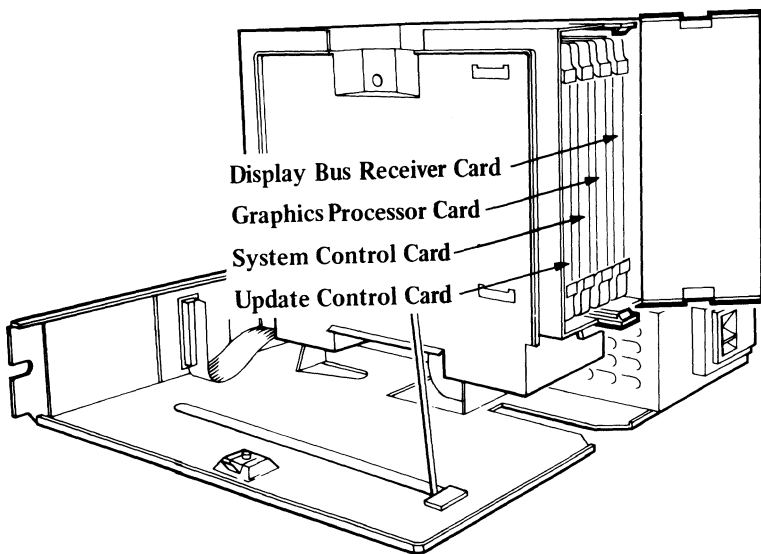


Figure 5-78. Card Positions, Logic Gate A1

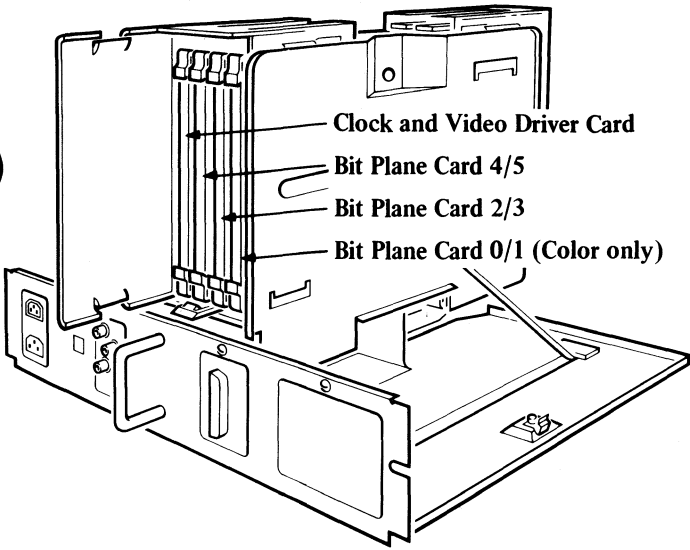


Figure 5-79. Card Positions, Logic Gate B1

5. Operate the levers in the directions shown by the arrows in the figure below.
6. Remove the card.

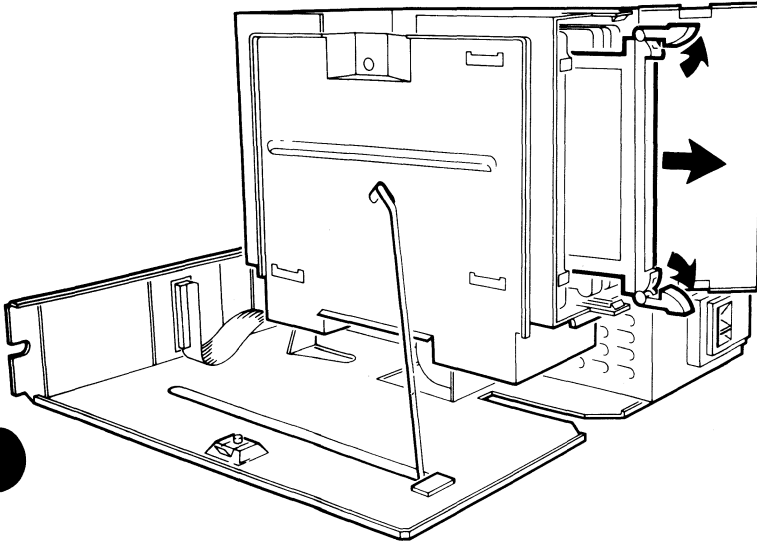


Figure 5-80. Removing the Card

Installing the DAU Logic Cards (S5755)

1. **Warning:** Always use a card holder (IBM part 1743144) when installing a card, to prevent contact with other cards.

Push the card into its socket and lock the levers in place.

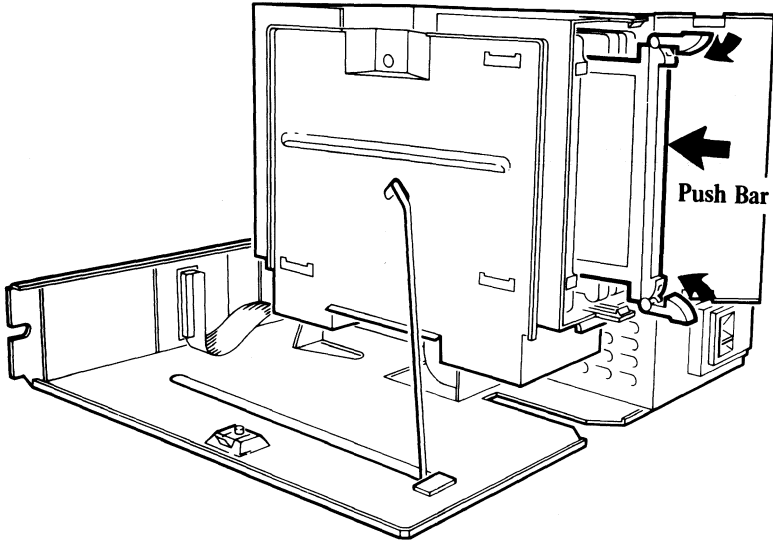


Figure 5-81. Installing the Card

2. Complete the installation in the reverse sequence to removal procedures.

5378 DAU Interconnect Card

Removing the Interconnect Card (S5760)

1. Remove the DAU cover (S5710).
2. Remove the video cable from logic gate B, position A3.
3. Remove the plastic cable retainer, then disconnect the PC flexi-interconnect cable from gate A.

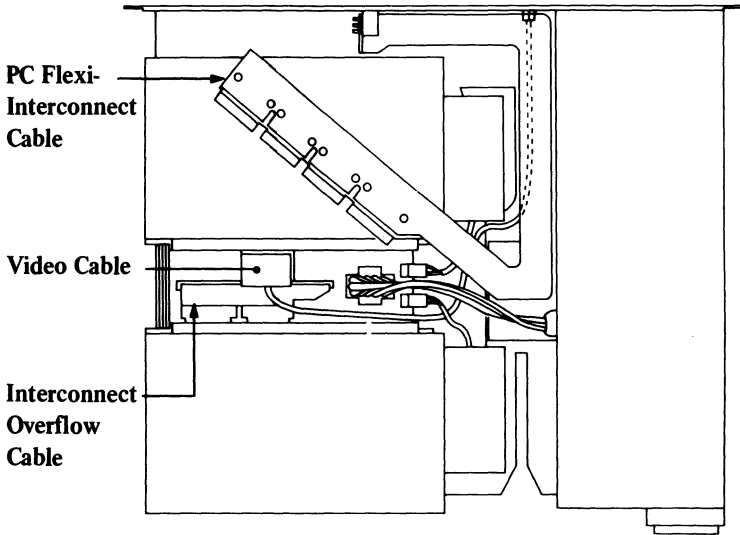


Figure 5-82. Removing PC Flexi-Interconnect and Video Cables

4. Remove the plastic cable retainer. Disconnect the interconnect overflow flexi-cable, first from the interconnect card, then from the logic gate (positions B2 and B3).

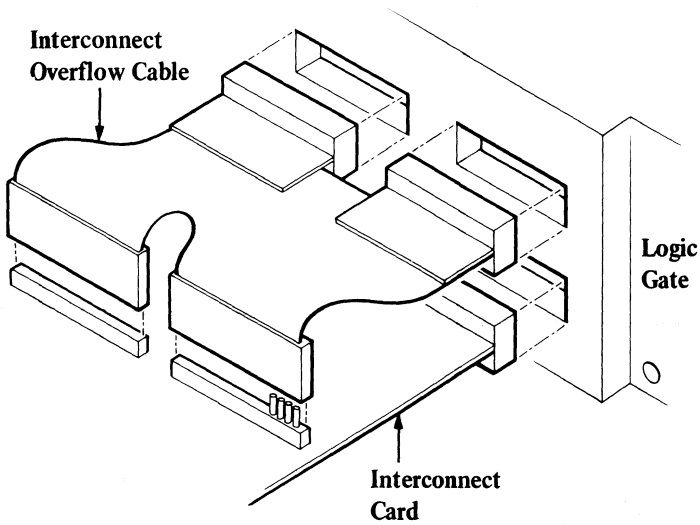


Figure 5-83. Disconnecting the 5378 Interconnect Overflow Flexi-Cable

5. Remove the logic gate power connector J3.
6. Remove the fan power-input connectors PX1 and PX2.

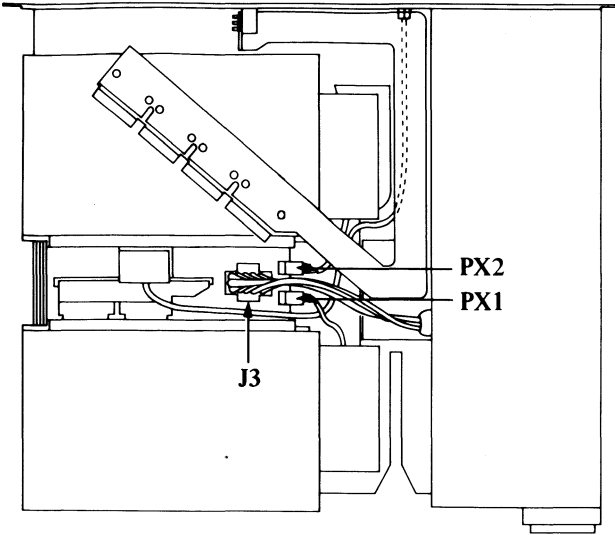


Figure 5-84. Removing 5378 Logic Card and Fan Power Cables

7. Remove the lock screw that fastens logic gate A to the fan housing.

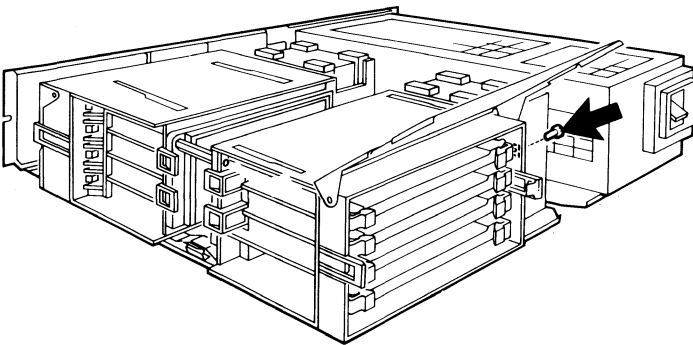


Figure 5-85. Removing 5378 Logic Gate to Fan Housing Lockscrew

8. Remove the central lifting bar lockscrew that fastens logic gate A to logic gate B.

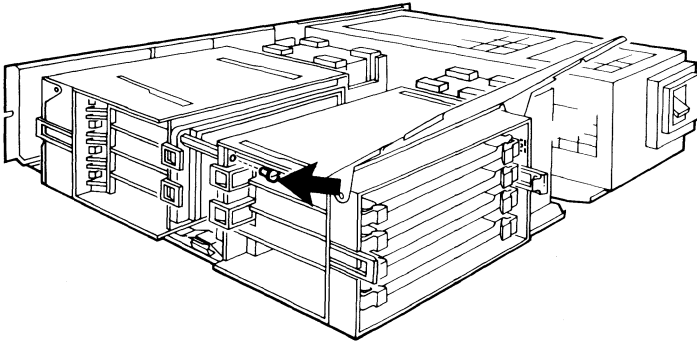


Figure 5-86. Removing 5378 Logic-Gate to Logic-Gate Clip Lockscrew

9. Slide logic gate A away from the interconnect card.

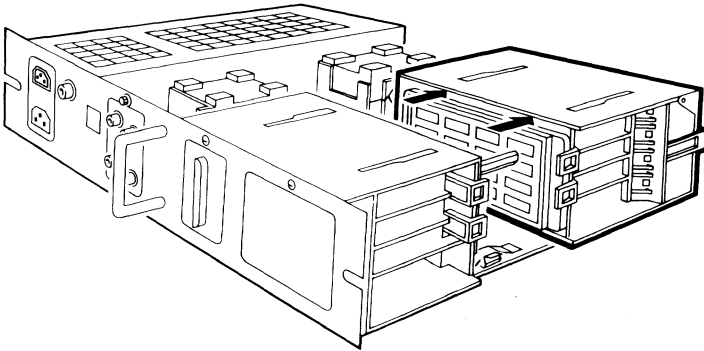


Figure 5-87. Disconnecting 5378 Logic Gate A from the Interconnect Card

10. Pull the interconnect card away from logic gate B.

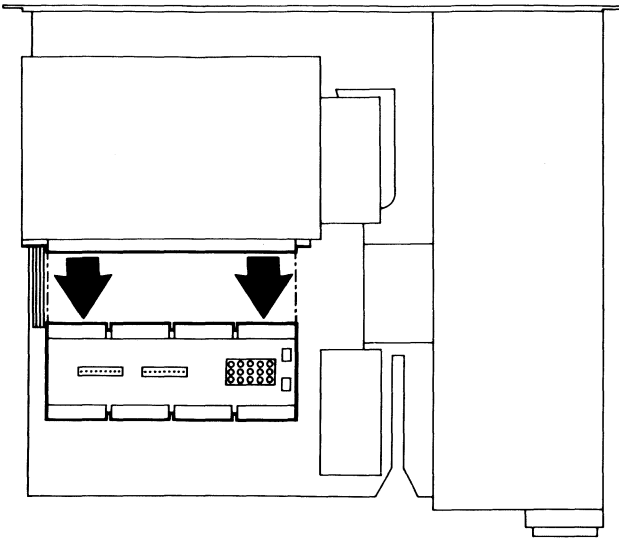


Figure 5-88. Removing the 5378 Interconnect Card

Installing the 5378 Interconnect Card (S5765)

1. Install in the reverse sequence.

5378 DAU Logic Boards

Removing 5378 Logic Boards (S5770)

Removing 5378 Gate-A Logic Board (S5780)

1. Remove the four logic cards from logic gate A1 (S5750).
2. Remove the interconnect card ((S5760), steps 1 through 9 only).
3. Release the logic board support frame from the logic board.

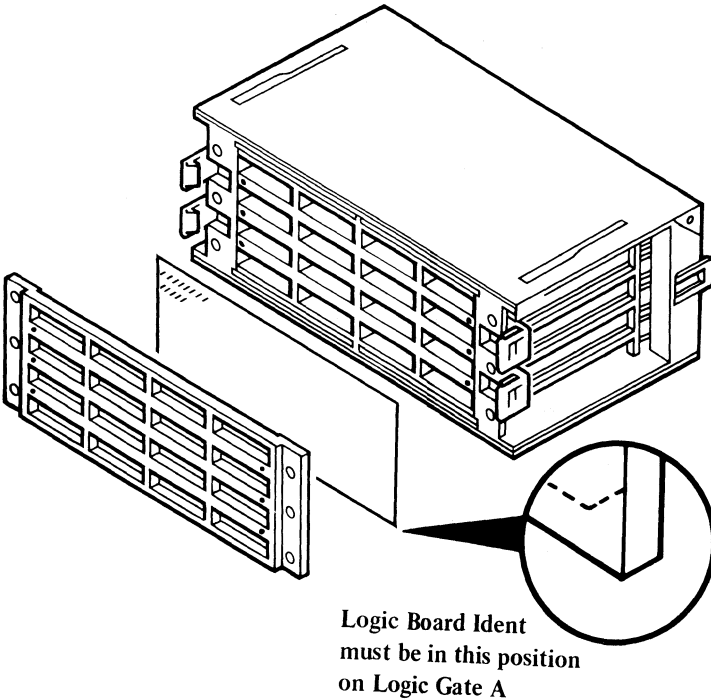


Figure 5-89. 5378 Logic Board Assembly Gate A1

Installing 5378 Gate-A1 Logic Board (S5785)

1. Install in the reverse sequence.

Removing 5378 Gate-B Logic Board (S5790)

1. Remove the video cable from logic gate B, position A3.
2. Remove the lock screw that fastens logic gate B to the fan housing.

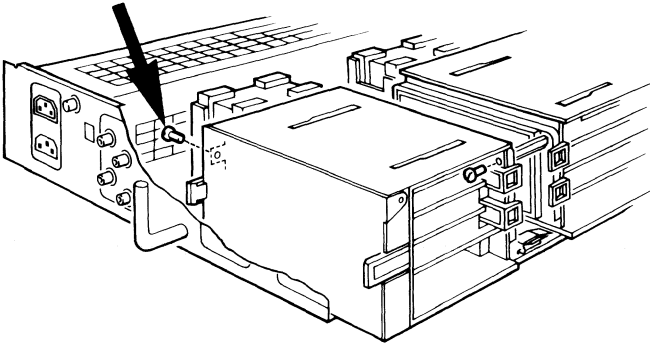


Figure 5-90. Logic Gate B to Fan Housing Lockscrew

CAUTION

For the next step, check that the support stay is locked in position; if not, the gate may fall and damage components.

3. Press the logic gate locking catch, lift the logic gate assembly into the vertical position, and support it with the support stay.
4. Remove the four logic cards from logic gate B (S5750).
5. Remove the central lifting-bar lockscrew.

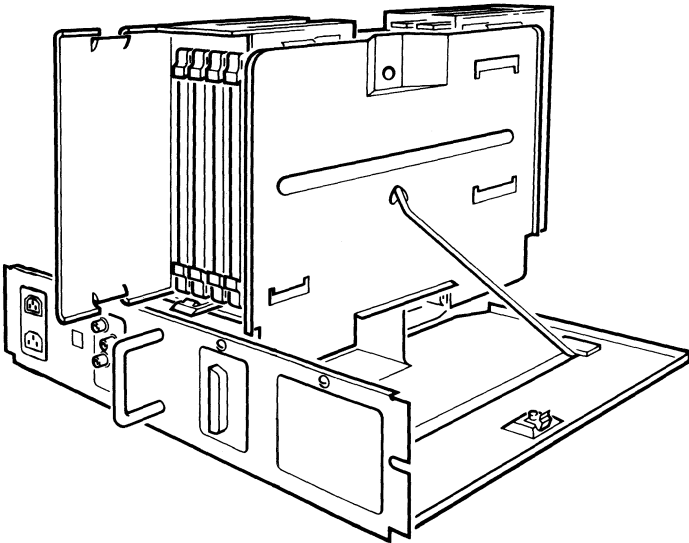


Figure 5-91. 5378 Locking Catch and Support Stay

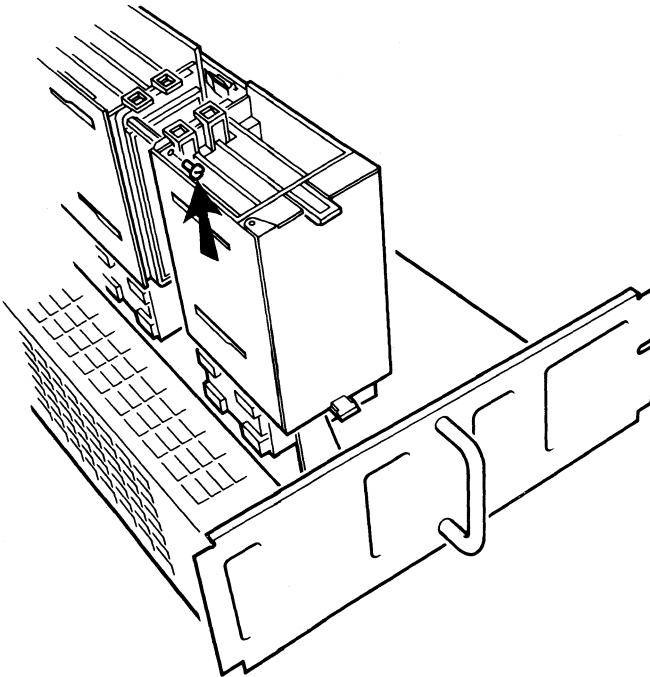


Figure 5-92. Logic Gate B to Lifting Bar Lockscrew

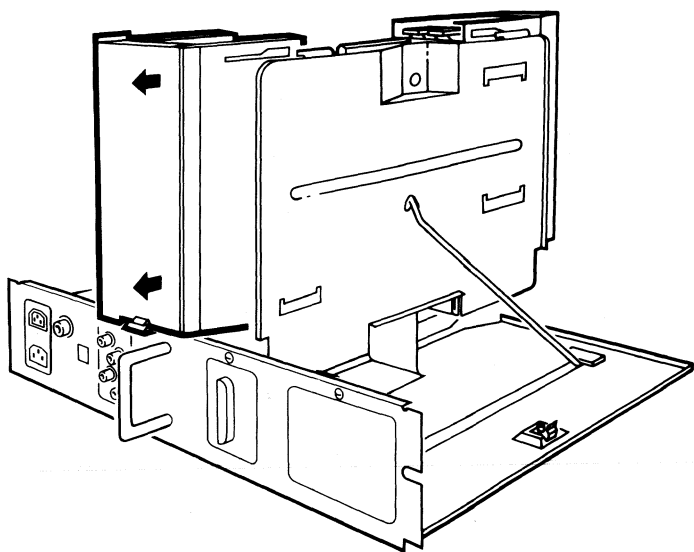


Figure 5-93. 5378 Logic Gate B1 Removal

6. Slide logic gate B away from the interconnect card and remove it from the main assembly.

7. Release the logic board support frame from the logic board.

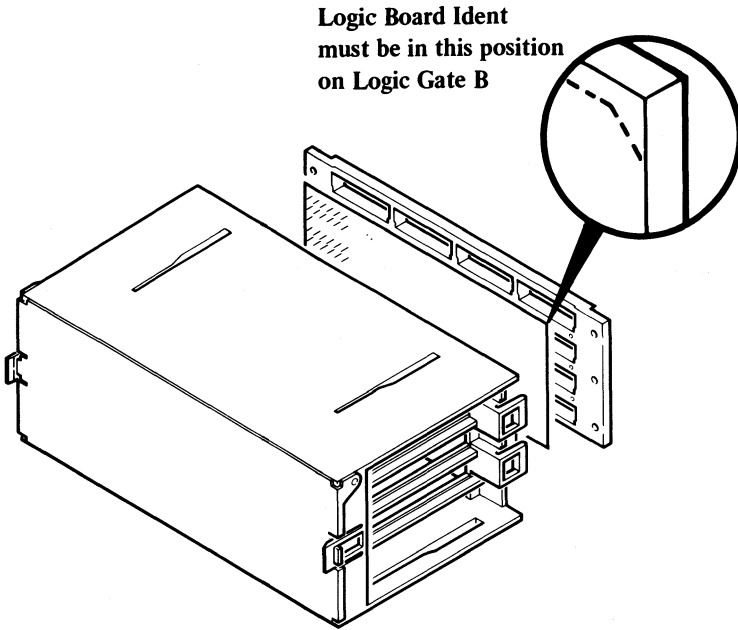


Figure 5-94. 5378 Logic Board Assembly Gate B1

Installing 5378 Gate-B1 Logic Board (S5795)

1. Install in the reverse sequence.

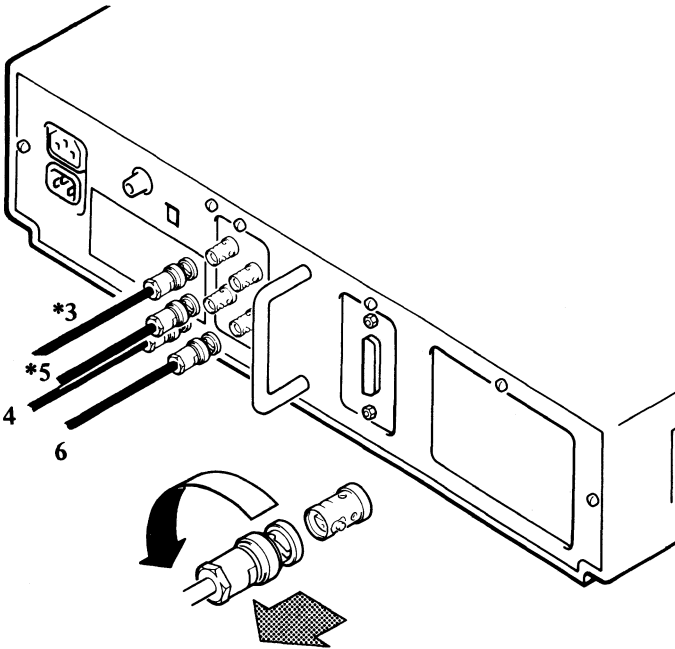
5378 DAU Cables

5378 DAU Video Cable (S1)

Removing 5378 DAU Video Cable (S1) (S5800)

1. Remove the 5378 DAU cover (S5710).
2. Disconnect the four video connectors. Turn each cable counterclockwise and pull to disconnect.

Note: There are only two cables for a Model M01 display.



* Color Only

Figure 5-95. 5378 Video Connectors

3. Remove the video connector-panel lockscrew using a 3-mm hexagon wrench (IBM part 1749238).
4. Remove the plastic cable retainer, then disconnect the connector from position A3, gate B1, of the logic gate.
5. Remove the plastic cable retainer, then disconnect the PC flexi-interconnect cable.

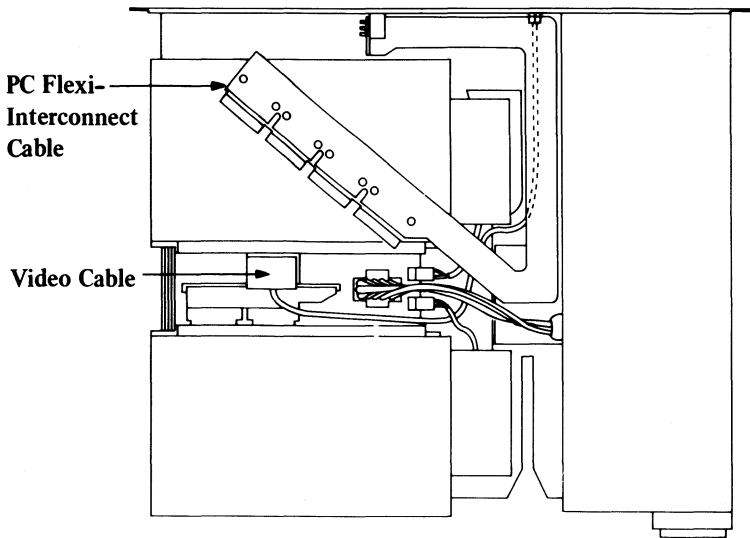


Figure 5-96. 5378 Video Cable, Logic-Gate Connection

6. Pull out the cable from the opening in the rear of the DAU.

Installing the 5378 DAU Video Cable (S1) (S5805)

1. Install in the reverse sequence.

5378 DAU PC Flexi-Interconnect Cable (S2)

Removing 5378 DAU PC Flexi-Interconnect Cable (S2) (S5810)

1. Remove the DAU cover (S5710).
2. Remove the two connector lockscrews that fasten the system unit cable to the DAU rear panel.
3. Unplug the connector.

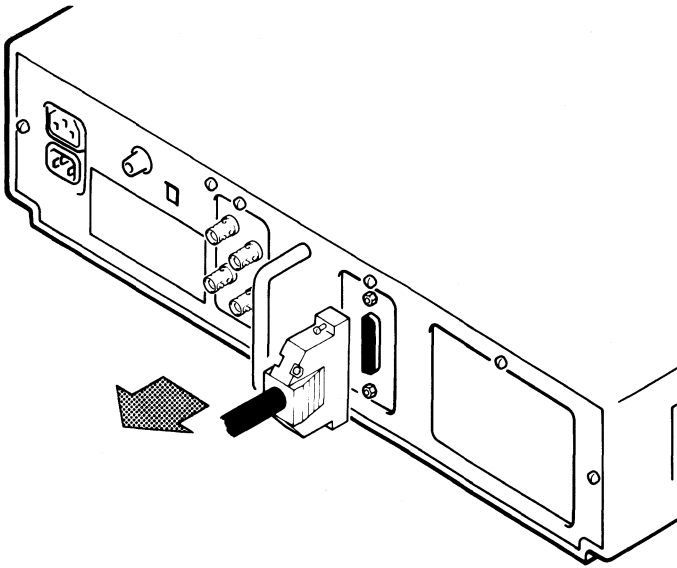


Figure 5-97. Removing the System Unit Cable from the 5378 DAU Connector

4. Remove the connector panel lockscrew using a 3-mm hexagon wrench (IBM part 1749238).

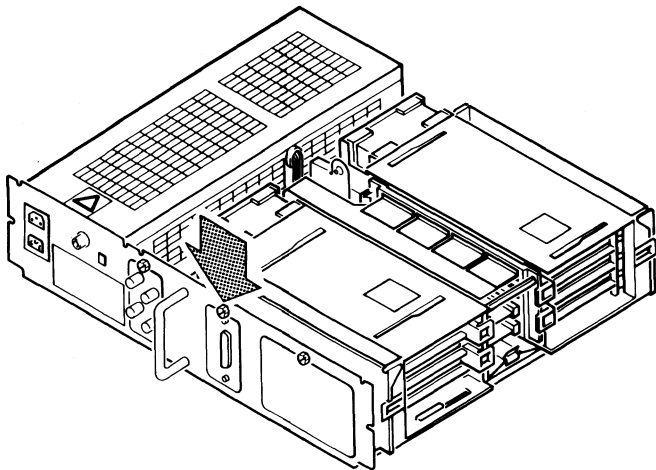


Figure 5-98. 5378 PC Connector Lockscrew

5. Lift the PC connector panel to release it from the clips holding it to the DAU rear panel.

6. Disconnect the connector from position A3 gate B1 of the logic gate.
7. Disconnect the connectors from positions D2, D3, D4, and D5, on gate A1, of the logic gate.

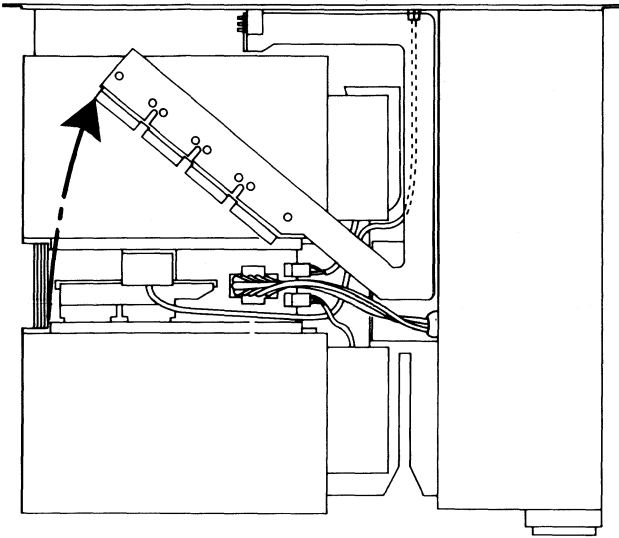


Figure 5-99. Removing the 5378 PC Flexi-Interconnect Cable

8. Remove the cable from the DAU.

Installing the 5378 DAU PC Flexi-Interconnect Cable (S2) (S5815)

1. Remove the backing cover from the PC flexi - interconnect cable.
2. Guide the cable through the center of the logic gate, and place the PC connector panel against the opening in the rear of the DAU assembly.

3. Fasten the PC connector panel with its lockscrew.

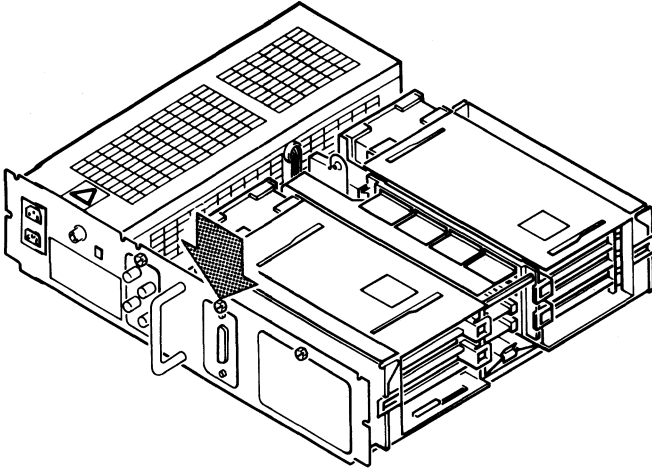


Figure 5-100. 5378 PC Connector Panel Lockscrew

4. Push the connectors onto positions D2, D3, D4, and D5, on Gate A1 of the logic gate.

5. Install the connector into position A3, Gate B1.

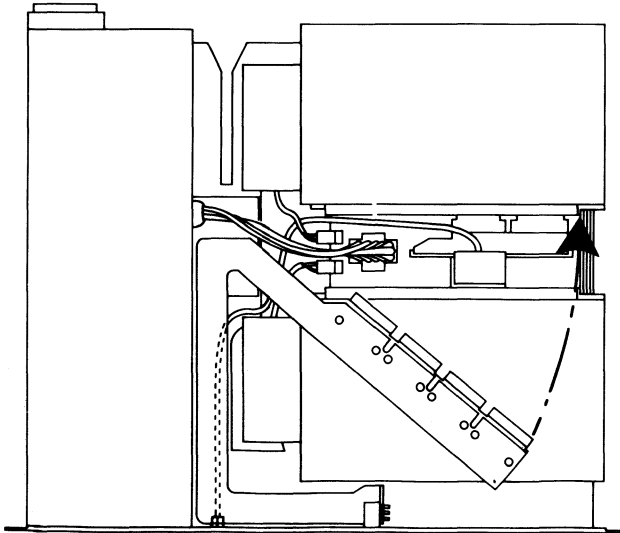


Figure 5-101. 5378 PC Cable, Logic Gate Reconnections

6. Push the PC multiway connector onto the DAU rear panel connector and correctly tighten the two fastening screws.

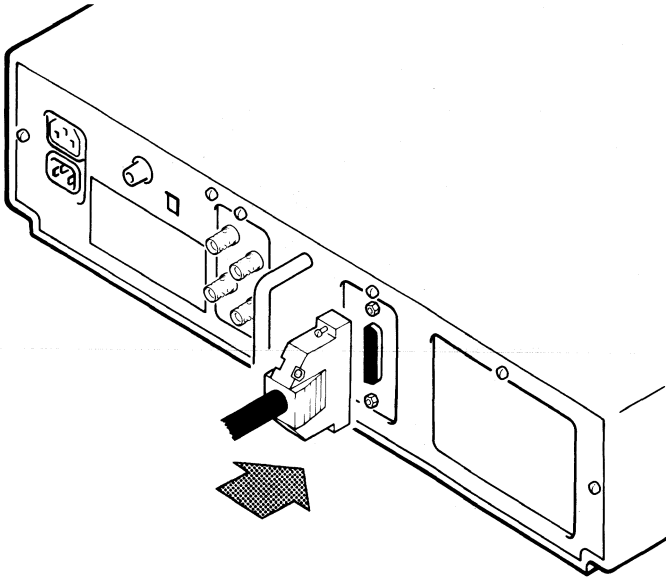


Figure 5-102. 5378 PC Connector Reconnections

5379 Display

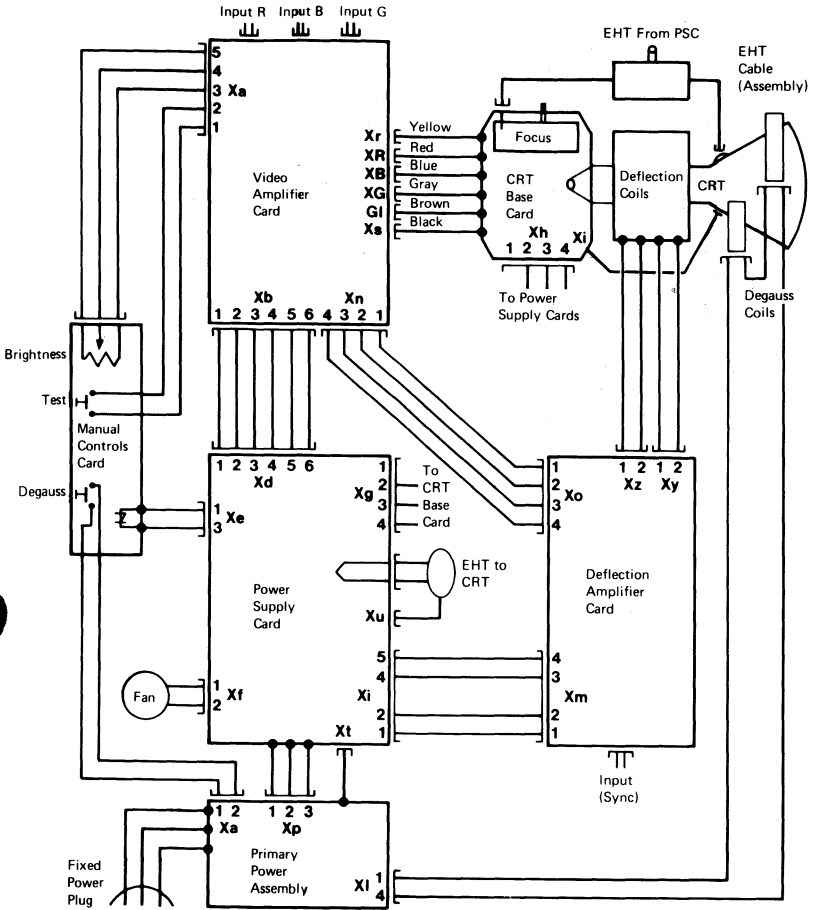


Figure 4-1. 5379 Color Display Cable Connections

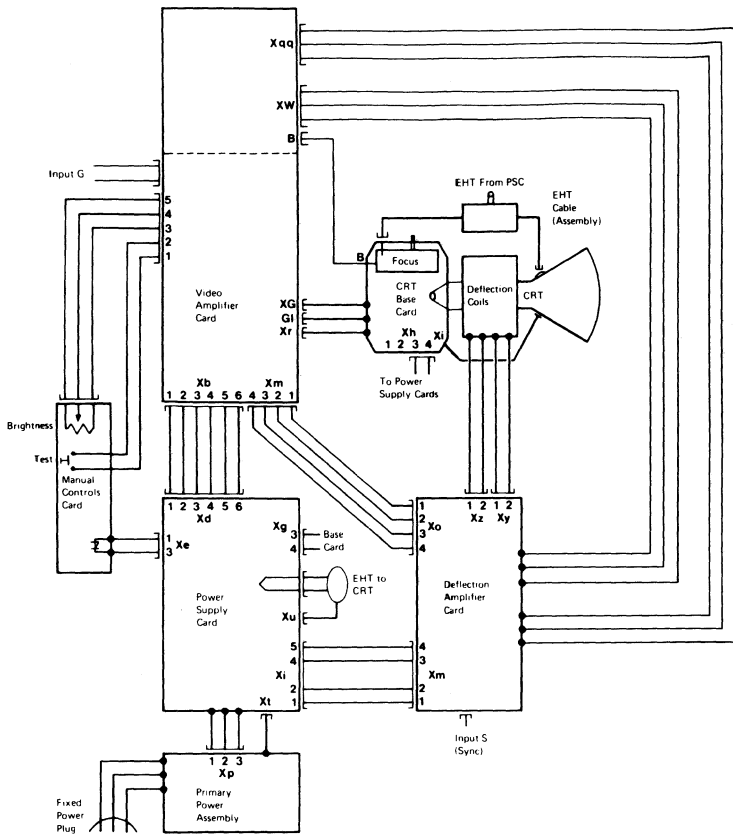


Figure 4-2. 5379 Monochrome Display Cable Connections

5378 DAU Interconnect Overflow Cable (S6)

Removing the 5378 DAU Interconnect Overflow Cable (S6) (S5820)

1. This FRU is a subassembly of the DAU interconnect card; see (S5710), steps 1 through 3.

Installing the 5378 DAU Interconnect Overflow Cable (S6) (S5825)

1. Install in the reverse sequence.

Keyboard

The keyboard is a customer replaceable element (CRE).

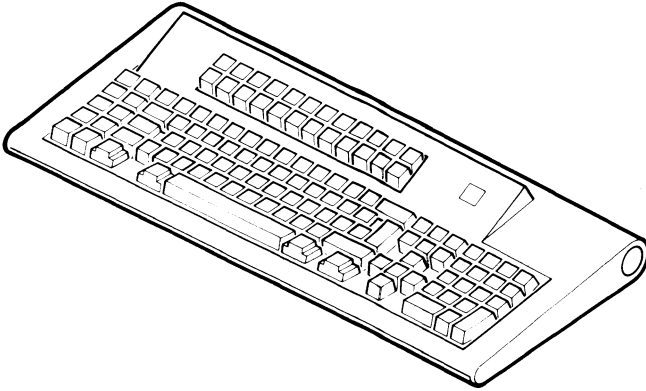


Figure 5-103. Keyboard

Disconnecting the Keyboard from Work Station (S5900)

1. Power off the work station in the correct sequence (system unit first), see Chapter 1, page 1-17.
2. Set the power switch of the printer to Off (see page 5-128).
3. Set the power switch of any other devices connected to the work station to Off.
4. Disconnect the display attachment unit, the system unit, and the printer power cables from their power outlets.
5. Disconnect the power cables of any optional devices from their power outlets.

6. Loosen the locking ring and disconnect the keyboard cable from the keyboard adapter cable (if installed), otherwise, disconnect the keyboard cable from the system unit.

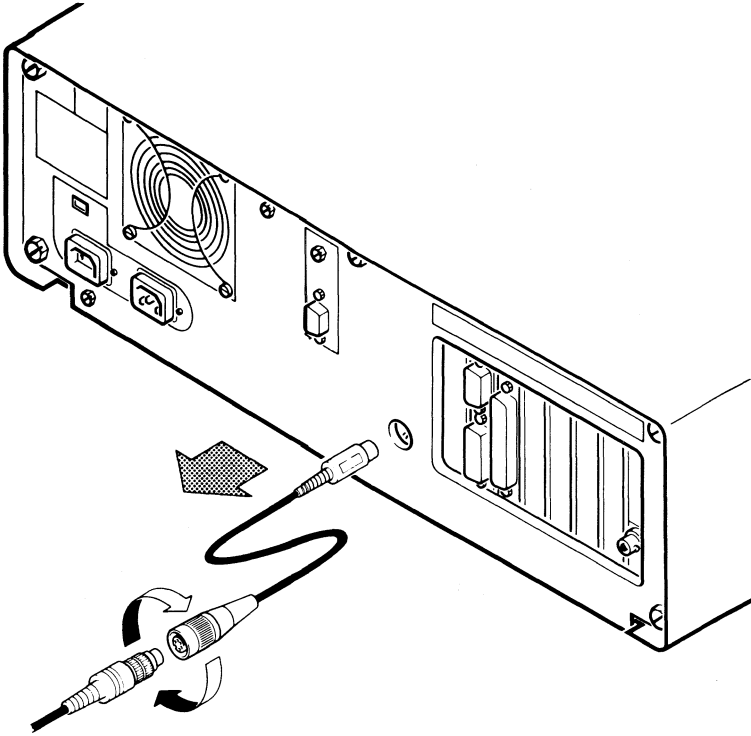


Figure 5-104. IBM 3270 Personal Computer Keyboard Adapter Cable Connection with Keyboard Cable

7. Remove the keyboard from the work station.

Connecting Keyboard to Work Station (S5905)

1. Perform all the procedures described for removing the keyboard from the work station (S5900), in reverse order.
2. Power on the work station in the correct sequence (system unit last), see Chapter 1, page 1-18.

5152 Printer

Printer Fuse

DANGER

1. **There are high voltages under the printer cover. Only service representatives may remove or install the printer mainline fuse.**
2. **Switch Off the power and remove the mainline power cable from the mainline power outlet.**

Removing the Fuse (S5930)

1. Switch Off the system unit.
2. Switch Off the printer.
3. Unplug the printer power cable.

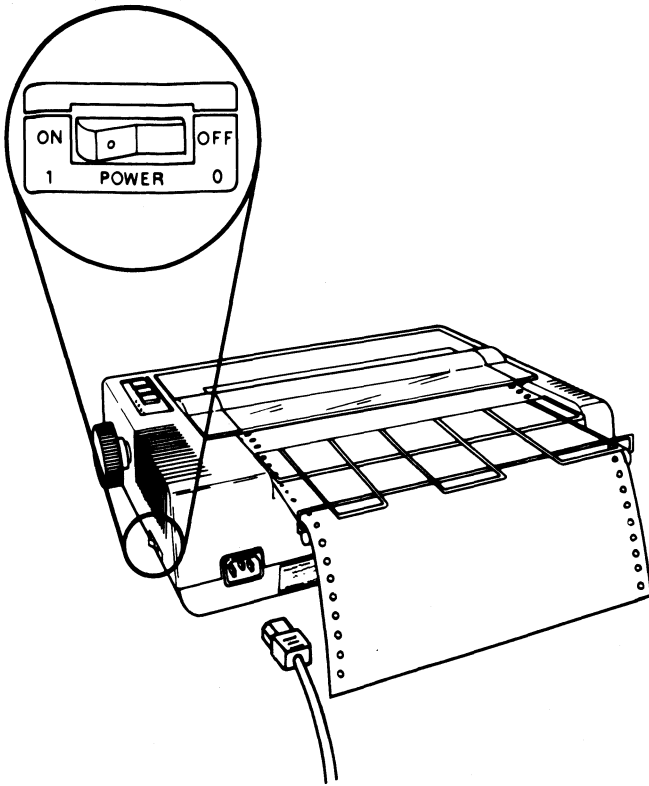


Figure 5-105. Printer Power Cable and Switch

Note: Use only the correct mainline power cable that has been approved for use in your country.

4. Remove any paper or forms from the printer by turning the roller knob counterclockwise.
5. Raise the printer access cover and lift it from the base.

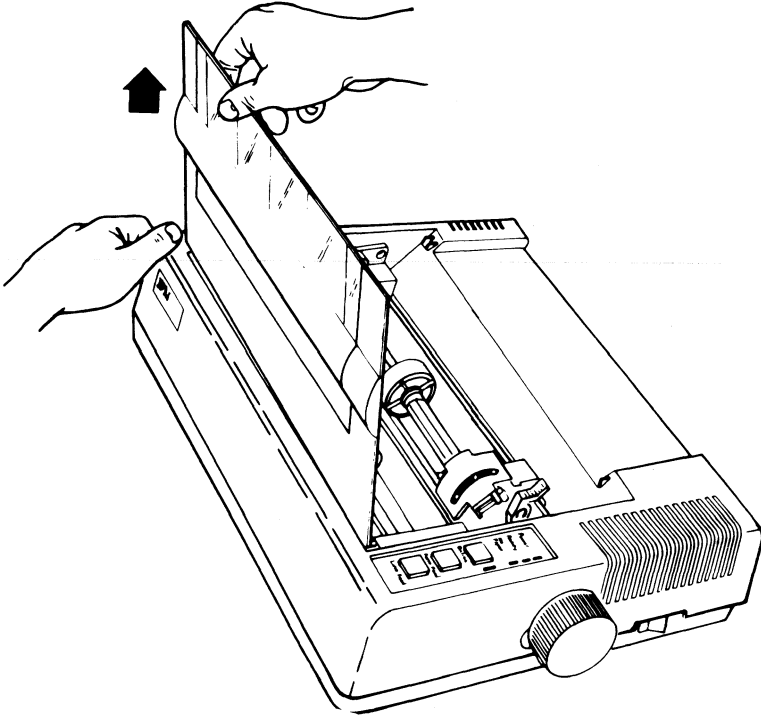


Figure 5-106. Printer Access Cover

6. Move to the rear of the printer, and compress and lift the left-hand side of the forms rack and remove it from the leftmost side hole in the printer frame.
7. Move the forms rack to the left to remove it from the rightmost side hole in the printer frame.

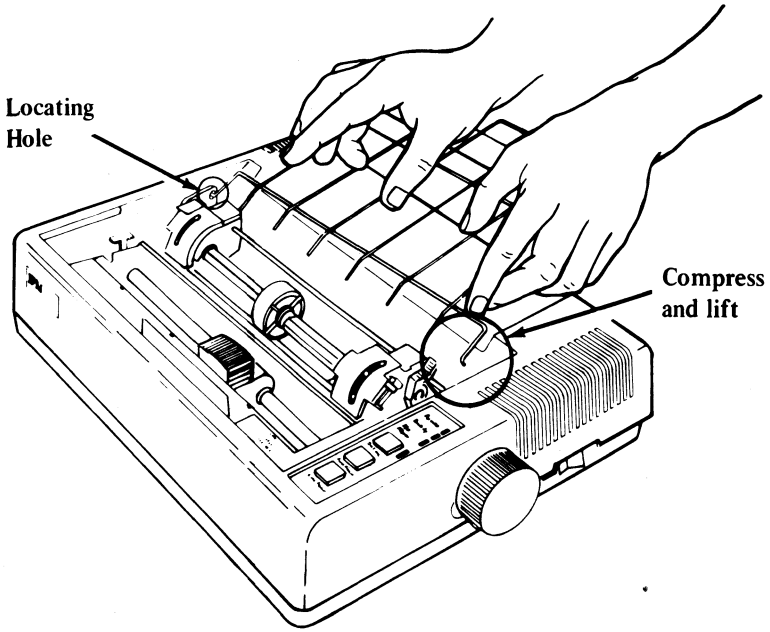


Figure 5-107. Removing the Printer Forms Rack

8. Remove the forms-tractor roller-knob.

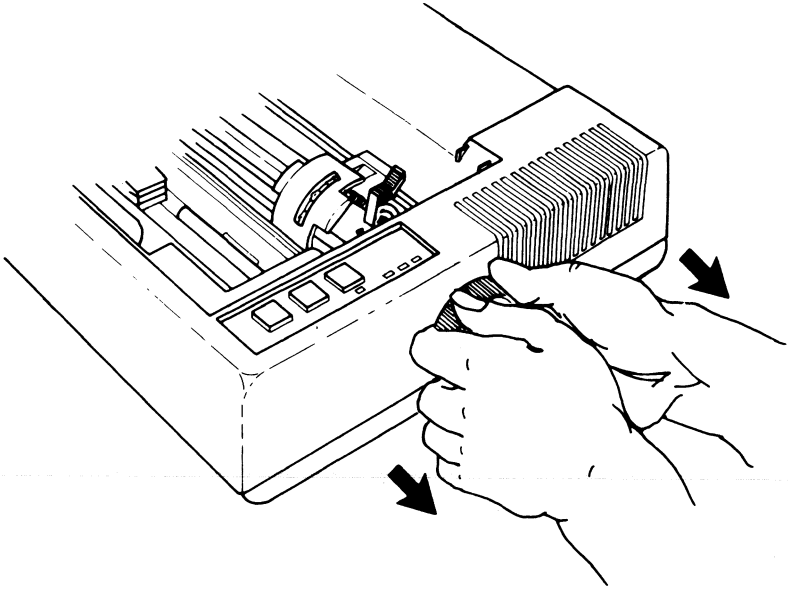


Figure 5-108. Removing the Roller Knob

9. Place the printer on its side and remove the four top-cover lockscrews (using a Phillips¹ screwdriver).

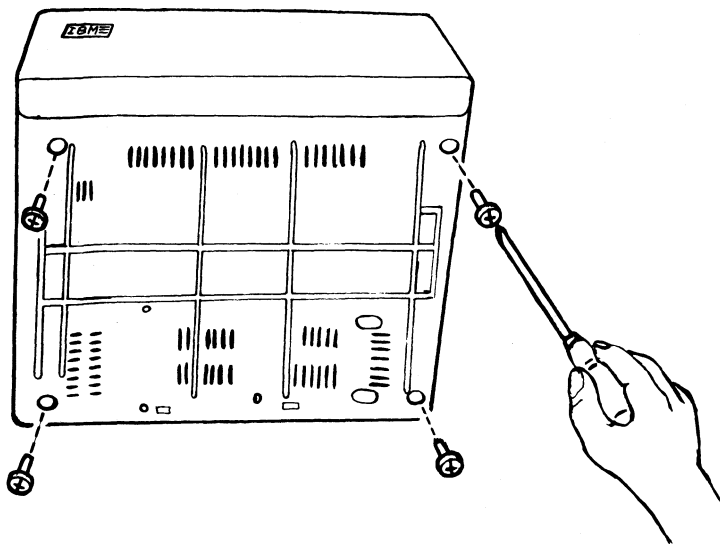


Figure 5-109. Top Cover Lockscrews

¹ Trademark of the Phillips Screw Company

10. Replace the printer onto its base.

11. **CAUTION**

Note that for the next step the top cover is still attached to the base by the wiring to the control switches.

Remove the top cover by lifting the left side, then moving it to the right over the roller-knob spindle.

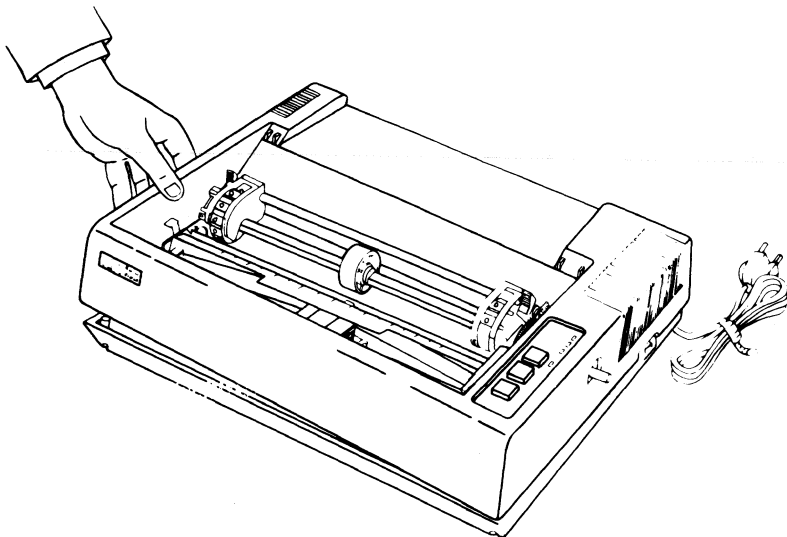


Figure 5-110. Top Cover Removal

12. Unscrew the mains assembly cover lockscrew (using a Phillips screwdriver), then lift the cover from the assembly.

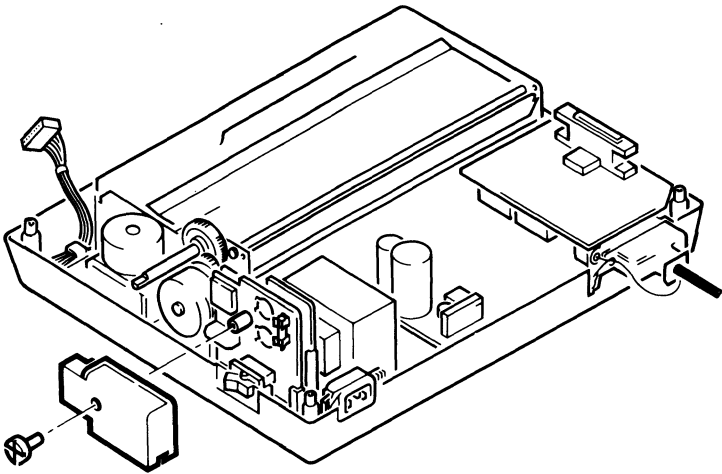


Figure 5-111. Mains Cover Removal

13. Remove the fuse.

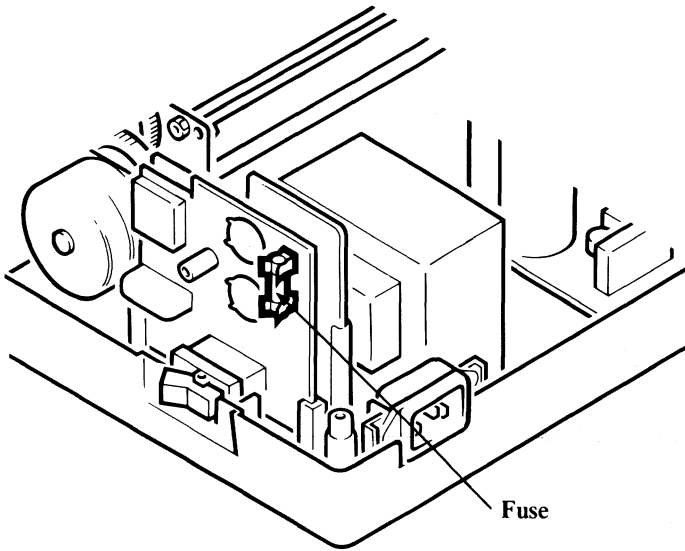


Figure 5-112. Fuse Removal

Installing the Fuse (S5935)

1. Install in the reverse sequence.

IBM 5277 Mouse and Pad (S5950)

The mouse and pad are customer replaceable elements (CREs).

Note: When ordering a new pad, check the mouse serial number. If the first and second digits of the serial number are 70, pad IBM part 1887687 must be ordered. If the first and second digits are not 70, order pad IBM part 1887724.

Disconnecting the Mouse from Work Station (S5955)

1. Power off the work station in the correct sequence (system unit first), see Chapter 1, page 1-17.
2. Set the power switch of the printer to Off (see page 5-128).
3. Set the power switches of any optional devices to Off.
4. Disconnect the display attachment unit, the system unit, and the printer power cables from their power outlets.
5. Disconnect the power cables of any optional devices from their power outlets.
6. Remove the two screws that fasten the mouse cable to the rear of the system unit and pull out the cable.

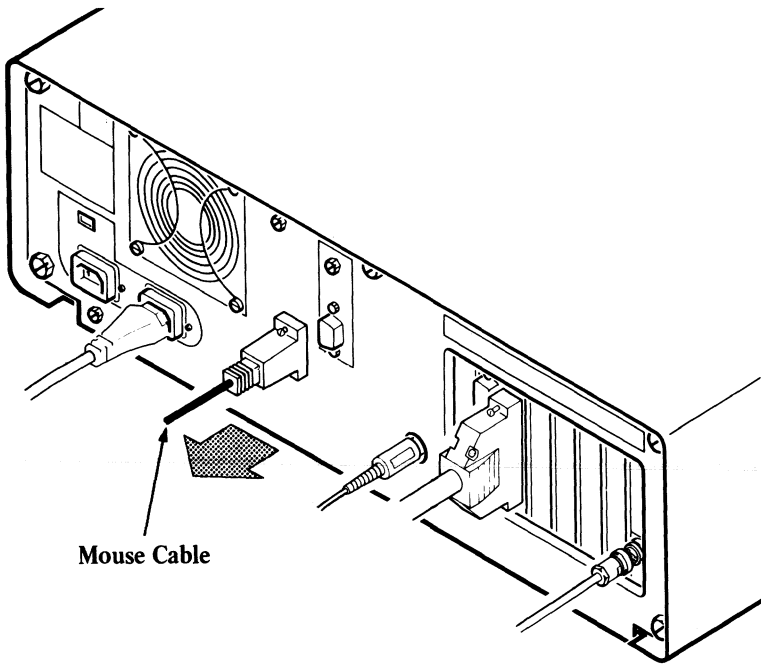


Figure 5-113. Mouse Cable Connection with System Unit

Connecting the Mouse to the Work Station (S5960)

1. Perform all the procedures described for disconnecting the mouse from the work station (**S5955**), in reverse order.
2. Power on the work station in the correct sequence (system unit last), see Chapter 1, page 1-18.

IBM 5083 Tablet (Model 2) with Stylus or 4-Button Cursor (S5970)

The tablet, stylus, and 4-button cursor are customer replaceable elements (CREs).

Disconnecting Tablet from Work Station (S5975)

1. Power off the work station in the correct sequence (system unit first), see Chapter 1, page 1-17.
2. Set the power switch of the printer to Off (see page 5-128).
3. Set the power switches of any optional devices to Off.
4. Disconnect the display attachment unit, the system unit, and the printer power cables from their power outlets.
5. Disconnect the power cables of any optional devices from their power outlets.

6. Remove the two screws that fasten the tablet cable to the rear of the system unit and pull out the cable.

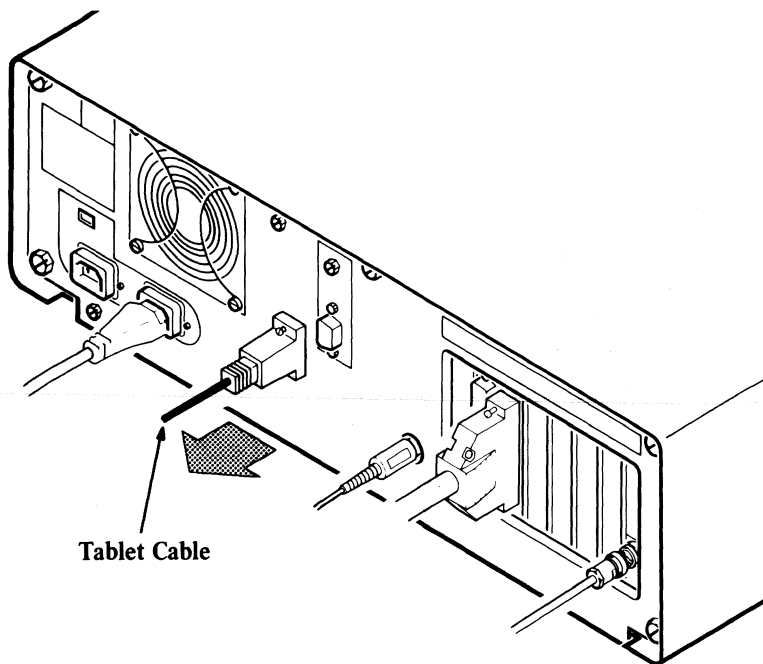


Figure 5-114. Tablet Cable Connection with System Unit

Connecting Tablet to Work Station (S5980)

1. Perform all the procedures described for disconnecting the tablet from the work station (S5975), in reverse order.
2. Power on the work station in the correct sequence (system unit last), see Chapter 1, page 1-18.

IBM Color Plotters (S5990)

Some of the IBM plotters that may be used in the work station are:

- 7371 plotter
- 7372 plotter
- 7374 plotter
- 7375 plotter.

The plotters are connected to the work station through the General Purpose Interface Bus Adapter interface-adapter, installed in the system unit.

For information on disconnecting the plotters from a work station, and also connecting them into a work station, see *IBM 3270 Personal Computer AT/GX: Guide to Operations*, SA33-3161, or *IBM Personal Computer AT/GX: Guide to Operations, Graphics Display Option Kit*, SA33-3185.

For details of service and maintenance publications associated with the plotters see “Related Publications” on page xlix.



Chapter 6. System Setup, Jumpers, and Switch Settings

For information on system setup, jumpers, and switch settings other than that given in this chapter, see the IBM Personal Computer AT *Hardware Maintenance and Service* manual.

Memory Expansion Options

The memory in the system unit is in two parts:

- Base memory
- Expansion memory.

Base memory consists of 512K bytes of memory modules on the system board, and possibly a further 128KB memory expansion.

Expansion memory consists of one or more memory expansion options. These memory expansion options will be configured in one of two ways:

- On 5170 and 5373 System Units as contiguous memory starting at address 1M (M equals 1,048,576).

or

- On 5373 System Units **only** as Even-Megabyte-Aligned (EMA) extended memory in the address ranges of 12 – 13M and 14 – 15M.

| Contiguous Expansion Memory

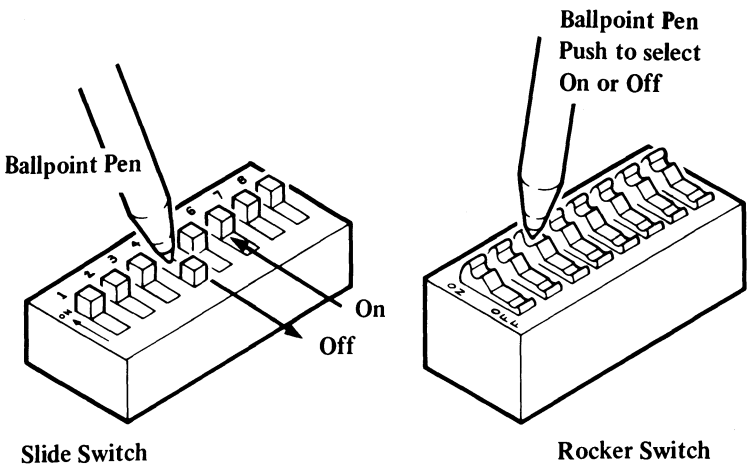
| For details of contiguous expansion memory option switch settings, see the IBM Personal Computer AT *Hardware Maintenance and Service* manual.

| EMA Extended Memory

| The 512KB Memory Expansion Adapter can be configured as a 512KB EMA extended memory option. It is the settings of the switches on the card that define the way in which the card is used. Use the 512KB memory expansion option part number when ordering a new card.

| *Notes:*

- | 1. *Contiguous memory expansion options must be entered in the normal way when the Setup program is run; they are also checked by POST and the 200 diagnostics test. However, 512KB options to be used as EMA extended memory must **not** be entered when the Setup program is run; they are not checked by POST nor by the 200 diagnostics test, and problem determination is performed using a special test (option 8) in the 4400 display tests.*
- | 2. *If you are not sure whether your system unit has EMA extended memory or contiguous expansion memory, compare the switch settings in Figure 6-2 on page 6-4 with your memory options. The location of the switches on the card is shown in Figure 6-1, opposite.*



NOTE: Either switch may be fitted on the adapter card.

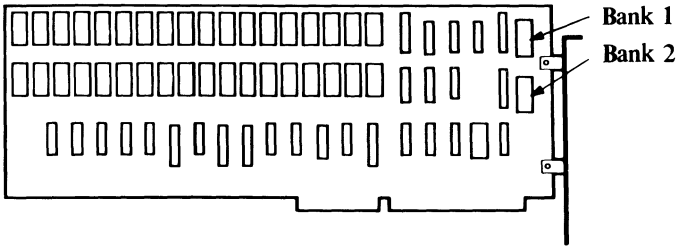
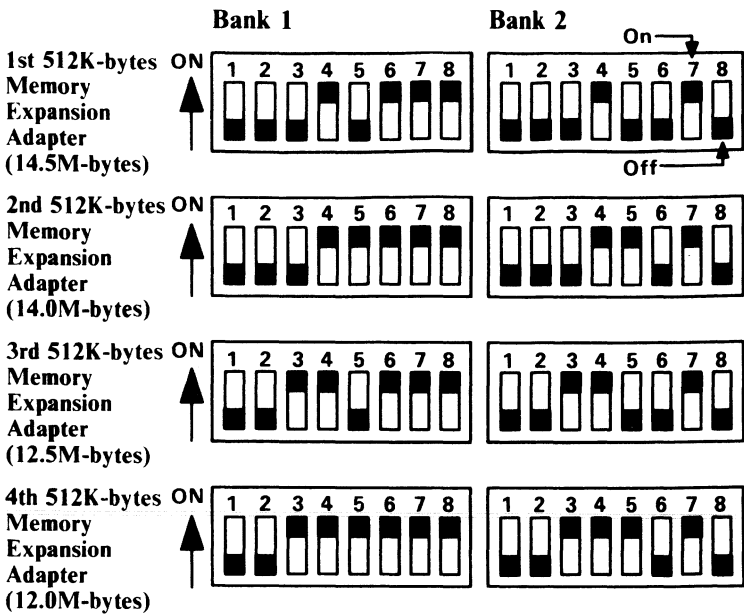




Figure 6-1. EMA Extended Memory Adapter Card Switches




 For Slide Switches slide the selector to the position shown for ON or Off.
 

ON For Rocker Switches press the switch down in the indicated position ■ to select On or Off. OFF

Figure 6-2. EMA Extended Memory Adapter Cards Switch Settings

Chapter 7. Parts Catalog

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Limited Warranty – IBM Service Parts (U.S. and Puerto Rico)

The warranty terms and conditions applicable in the country of purchase (except for the U.S. and Puerto Rico) for an IBM Personal Computer Product are available from the supplier. Please retain them with your proof of purchase.

The International Business Machines Corporation warrants that each IBM Service Part will be free from defects in materials or workmanship under conditions of normal use for a period of 90 days from the date of purchase from IBM or an Authorized IBM Personal Computer Dealer. Service parts will be either reconditioned or new parts. Should an IBM Service Part fail to be free from defects in materials or workmanship during the 90-day warranty period, IBM will, at its option, repair or replace this Service Part at no charge in the United States and Puerto Rico. All replaced Service Parts will become the property of IBM. This limited warranty does not include service to repair damage to the Service Part resulting from accident, disaster, misuse, abuse, or non-IBM modification of the Product.

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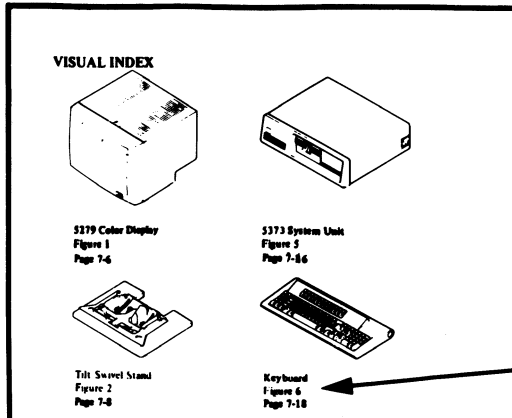
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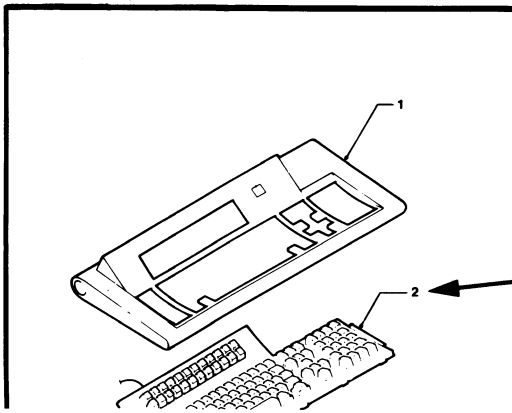
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HOW TO USE THIS PARTS CATALOG



1 Turn to the visual index then locate, by illustration, the assembly containing the part.



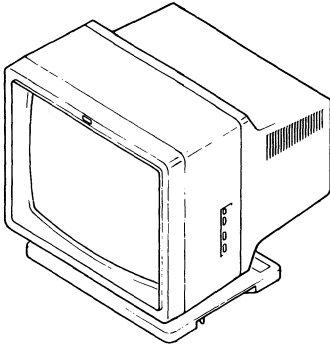
2 Turn to the page for that assembly. Then locate the part visually.

FIGURE- INDEX NUMBER	PART NUMBER	UNITS PER ASM	DESCRIPTION			
			1	2	3	4
7	6118344	1				KEYBOARD ASM, KEYBOARD
-	1351748	1				U.S. ENGLISH KEYBOARD ASM, OP
- 2	8529166	1				KEYBOARD CSA
-	8529167	1				BASE ASM
-	1837469	1				OVERLAY, KEYBOARD HOT SWOP

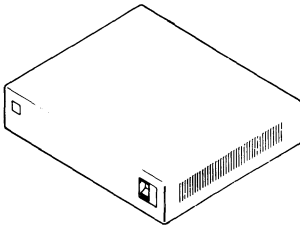
3 Using the index number shown with the part, refer to the accompanying listing to obtain major unit code, part number and description.

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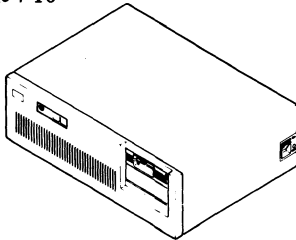
VISUAL INDEX



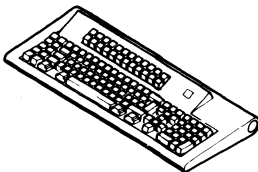
5379 Display Mods C01/M01
Figure 1
Page 7-6



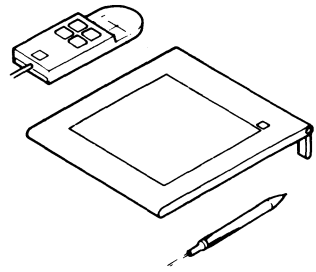
5378 Display Attachment Unit
Mods C01/M01
Figure 2
Page 7-10



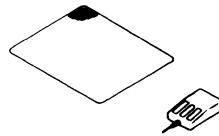
System Unit
Figure 3
Page 7-14



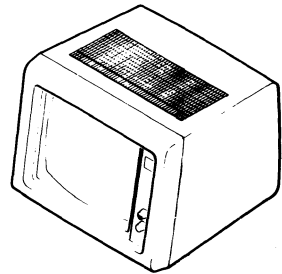
3270 Personal Computer Keyboard
Figure 4
Page 7-16



5083 Mod 2 Tablet, 4-Button
Cursor and Stylus
Figure 5
Page 7-18



5277 Mouse and Pad
Figure 6
Page 7-22



Dual Screen Feature
(for use with 5378)
Figure 7
Page 7-24

Note: Refer to IBM Personal Computer AT: Hardware Maintenance and Service for Part Numbers of other Keyboards.

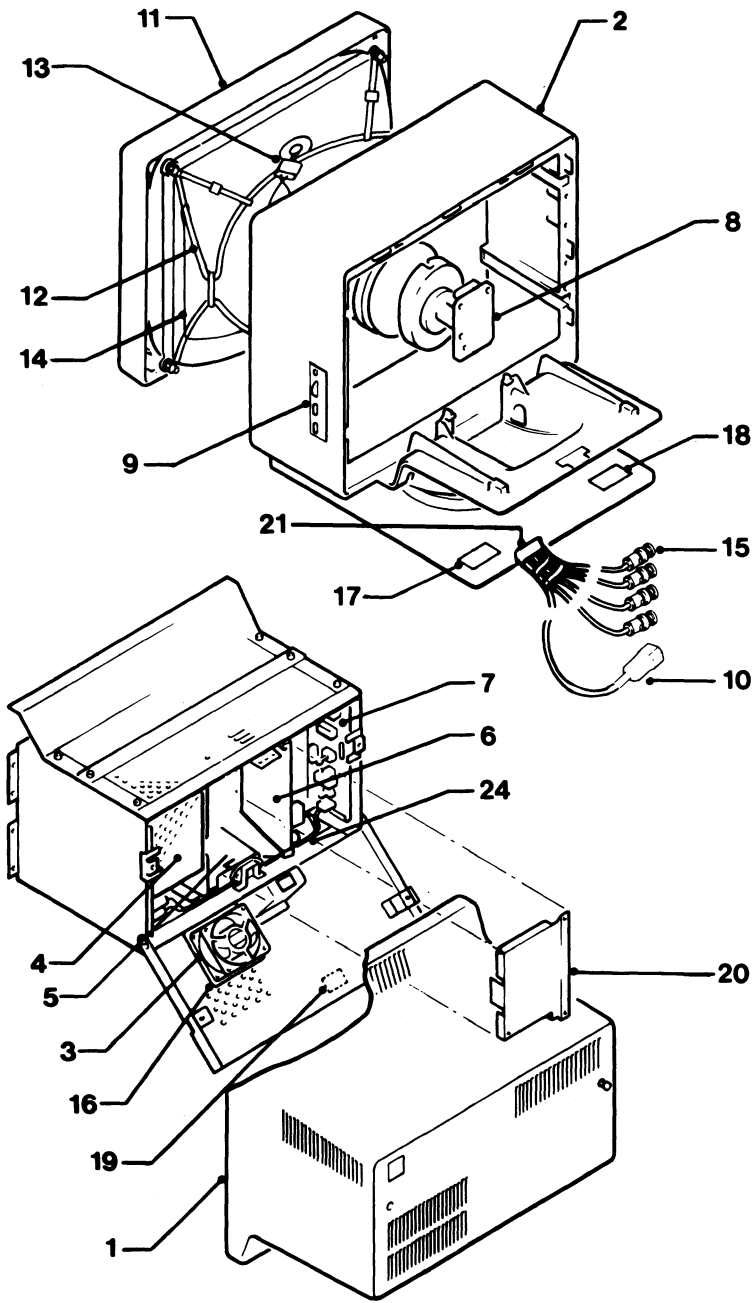


Figure 1. 5379 Display Asm Mods C01/M01

FIGURE- INDEX NUMBER	PART NUMBER	UNITS PER ASM	1 2 3 4				DESCRIPTION
			1	2	3	4	
1 -	4421614	1	5379				DISPLAY ASM (MONO) 19 IN.
	6243171	1	5379				DISPLAY ASM (MONO) 19 IN. GERMANY
	4421615	1	5379				DISPLAY ASM (COLOR) 19 IN. NORTHERN HEMISPHERE (SEE NOTE)
	6243170	1	5379				DISPLAY ASM (COLOR) 19 IN. SOUTHERN HEMISPHERE (SEE NOTE)
	6243172	1	5379				DISPLAY ASM (COLOR) 19 IN. GERMANY
- 1	4421771	1	.				COVER ASM, REAR-MONO
- 1	4421770	1	.				COVER ASM, REAR-COLOR
- 2	4421769	1	.				COVER, FRONT WITH TILT/SWIVEL
- 3	4421624	1	.				FAN, COLOR ONLY
- 4	4421761	1	.				CARD, POWER SUPPLY-MONO
- 4	4421621	1	.				CARD, POWER SUPPLY-COLOR
- 5	4421765	1	.				POWER SUPPLY ASM, PRIMARY-MONO
- 5	4421626	1	.				POWER SUPPLY ASM, PRIMARY-COLOR
- 6	4421763	1	.				CARD, VIDEO AMP-MONO
- 6	4421623	1	.				CARD, VIDEO AMP-COLOR
- 7	4421762	1	.				CARD, DEFLECTION AMP-MONO
- 7	4421622	1	.				CARD, DEFLECTION AMP-COLOR
- 8	4421766	1	.				CARD, CRT SOCKET-MONO
- 8	4421707	1	.				CARD, CRT SOCKET-COLOR
- 9	4421764	1	.				CARD, MANUAL CONTROLS-MONO
- 9	4421625	1	.				CARD, MANUAL CONTROLS-COLOR
- 10	4421628	1	.				POWER CABLE, MAINLINE
- 11	4421768	1	.				CRT AND BEZEL ASM-MONO
- 11	6243176	1	.				CRT AND BEZEL ASM-MONO GERMANY
- 11	6243175	1	.				CRT AND BEZEL ASM-COLOR GERMANY
- 11	4421767	1	.				CRT AND BEZEL ASM-COLOR NORTHERN HEMISPHERE (SEE NOTE)
- 11	6243179	1	.				CRT AND BEZEL ASM-COLOR SOUTHERN HEMISPHERE (SEE NOTE)
- 12	4421631	1	.				DEGAUSS COIL ASM-COLOR ONLY
- 13	4421632	1	.				EHT CABLE
- 14	4421917	1	.				CRT GROUND WIRE
- 15	4421629	2	.				CABLE, TWIN-AX ASM-MONO
- 15	4421629	4	.				CABLE, TWIN-AX ASM-COLOR
- 16	4421630	1	.				FAN, RUBBER MOUNT
- 17	4421636	1	.				LABEL, COLOR
- 17	4421634	1	.				LABEL, MONO
- 18	4421641	1	.				LABEL, FCC NOTICE
- 18	4421642	1	.				LABEL, FCC NOTICE-GERMAN
- 19	4421680	1	.				LABEL, HAZARD 25000 V
- 20	4421919	1	.				SAFETY SHIELD, REAR-MONO
- 20	4421918	1	.				SAFETY SHIELD, REAR-COLOR
- 21	4421515	1	.				SPIRAL BINDING

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FIGURE- INDEX NUMBER	PART NUMBER	UNITS PER ASM	1 2 3 4				DESCRIPTION
			1	2	3	4	
- 22	4421627	1	.				SPARES KIT 1-MECHANICAL SCREW, TAPTITE, M4, 8MM LG SCREW, TAPTITE, M4, 12MM LG SCREW, SELF-TAP, 2.9X13MM LG SCREW, SELF-TAP, 3.5X9.5MM LG SCREW, BEZEL MOUNTING SCREW, CARD CAGE MOUNTING LCKW, STAR CABLE TIE CABLE TIE TRIMMER KNOB CLAMPING RING, EHT COLLET FOOT, RUBBER LOCKNUT, GROUND WIRE GROUND WIRE (REAR DOOR) BUSH, INSULATED BUSH, INSULATED LOGO PLATE (REAR)
- 23	4421772	1	.				SPARES KIT 2-CARD GUIDES CARD GUIDE-UPPER CARD GUIDE-LOWER CARD GUIDE-REAR
- 24	4421773	1	.				SPARES KIT 3-CABLES CABLE, XO-XN CABLE, XG-XH CABLE, XA-XB CABLE, XD-XB CABLE, XI-XH NOTE: SOUTHERN HEMISPHERE COUNTRIES ARE: ARGENTINA, AUSTRALIA, BRAZIL, BRUNEI, C.AFRICA, CHILE, INDONESIA, MALAYSIA, NEW ZEALAND, PARAGUAY, PERU, SIERRA LEONE, SINGAPORE, S.AFRICA, SRI LANKA, SUDAN, THAILAND, URUGUAY, NORTHERN HEMISPHERE COUNTRIES ARE: AFGHANISTAN, BANGLADESH, BERMUDA, BURMA, CANADA, C.AMERICA, COLUMBIA, EUROPE, GULF COUNTRIES, GUYANA, HONG KONG, ISRAEL, JAPAN, JORDON, KOREA, LEBANON, MEXICO, N.AFRICA, PAKISTAN, SYRIA, SURINAM, TAIWAN, USA, VENEZUELA, WEST INDIES.

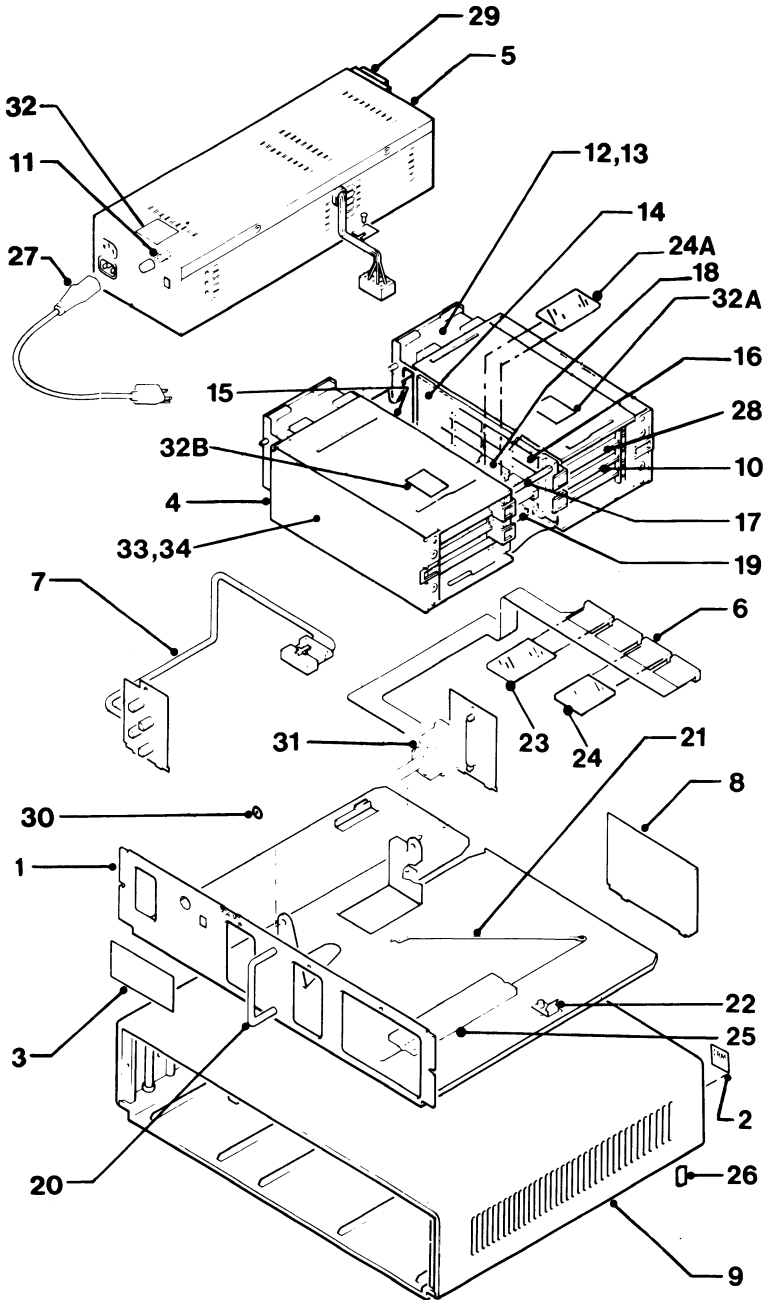


Figure 2. 5378 Display Attachment Unit Asm Mods C01/M01

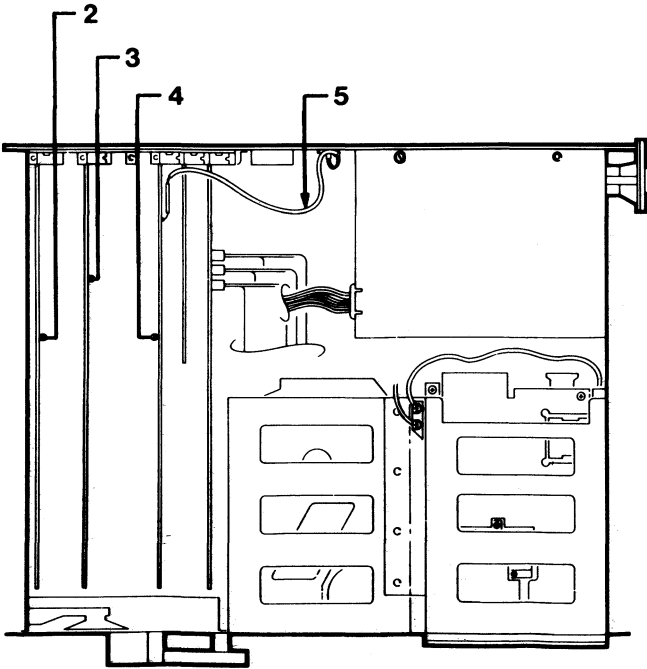
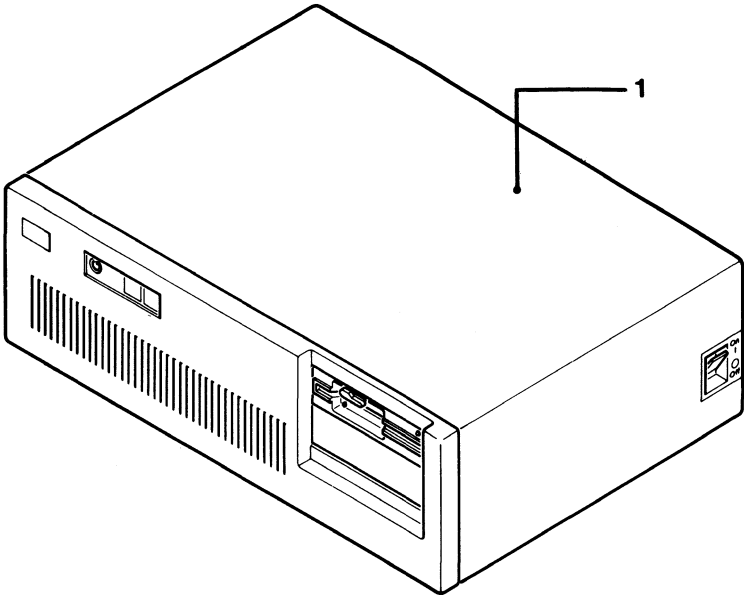
FIGURE- INDEX NUMBER	PART NUMBER	UNITS PER ASM	1 2 3 4				DESCRIPTION
			1	2	3	4	
2 -	NO PN	1					5378 DISPLAY ATTACHMENT UNIT (MONO)
	NO PN	1					5378 DISPLAY ATTACHMENT UNIT (COLOR)
- 1	4421590	1					. PLATE ASM
- 2	4421606	1					. NAME PLATE, LOGO
- 3	4421694	1					. LABEL, USE FOR MONO-RALEIGH M/CS
- 3	4421638	1					. LABEL, USE FOR COLOR-RALEIGH M/CS
- 3	4421635	1					. LABEL, USE FOR MONO-GNCK M/CS
- 3	4421637	1					. LABEL, USE FOR COLOR-GNCK M/CS
- 4	4421585	2					. LOGIC GATE
- 5	4421613	1					. POWER SUPPLY ASM
- 6	8233832	1					. CABLE ASM, SIGNAL FLEXI
- 7	4421620	1					. CABLE ASM, VIDEO
- 8	4421596	1					. PANEL, BLANK
- 9	4421580	1					. COVER ASM
- 10		1					. LOGIC CARDS SEE DETAIL A
- 11	5214456	1					. FUSE 6 AMP SB 250 V (PSU)
- 12	4421916	2					. FAN 12 V
- 13	4421589	4					. SHOCKMOUNT, FAN
- 14	8223696	1					. LOGIC BOARD A
- 15	8223695	1					. LOGIC BOARD B
- 16	4134800	1					. LOGIC BOARD, SUPPORT
- 17	4421691	1					. SPACER, HEXAGONAL
- 18	8233831	1					. CABLE ASM, FLEXI- INTERCONNECT OVERFLOW
- 19	8233876	1					. INTERCONNECT CARD
- 20	4421582	1					. HANDLE
- 21	4421649	1					. STAY, SUPPORT
- 22	4421610	1					. LATCH
- 23	4421774	1					. CABLE RETAINER, PLASTIC
- 24	4421775	1					. CABLE RETAINER, PLASTIC
- 24A	4421570	1					. CABLE RETAINER, PLASTIC
- 25	1735245	1					. FOAM STRIP
- 26	4421600	4					. FOOT
- 27	NO PN	1					. CABLE MAINLINE POWER
- 27	5640670	1					. CABLE MAINLINE POWER - U.S.
- 27	6952301	1					. CABLE MAINLINE POWER (UNSHIELDED) - U.S.
- 27	6952320	1					. CABLE MAINLINE POWER - EURO
- 27	6952356	1					. CABLE MAINLINE POWER - U.K./IRELAND
- 27	6952374	1					. CABLE MAINLINE POWER - ITALY
- 27	6952347	1					. CABLE MAINLINE POWER - S AFRICA
- 27	6952365	1					. CABLE MAINLINE POWER - SWITZERLAND
- 27	6952329	1					. CABLE MAINLINE POWER - DENMARK
- 27	6952383	1					. CABLE MAINLINE POWER - ISRAEL
- 27	6952356	1					. CABLE MAINLINE POWER - HONG KONG
- 27	6952356	1					. CABLE MAINLINE POWER - SINGAPORE

CARD PLUGGING CHART		
BOARD	POSITION	DESCRIPTION
A1	A2	UPDATE CONTROL CARD (UC)
A1	B2	SYSTEM CONTROL CARD (SC)
A1	C2	GRAPHICS PROCESSOR CARD (GP)
A1	D2	DISPLAY BUS RECEIVER CARD (DBR)
B1	A2	CLOCK AND VIDEO DRIVER CARD (CVD)
B1	B2	BIT PLANE CARD (BP4/5)
B1	C2	BIT PLANE CARD (BP2/3)
B1	D2	BIT PLANE CARD (BP0/1)
B1	B2	BIT PLANE CARD (BP4/5)
B1	C2	BIT PLANE CARD (BP2/3)
B1	D2	--- --- ---

A = COLOR
B = MONO

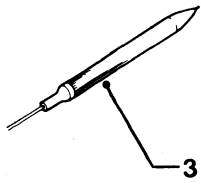
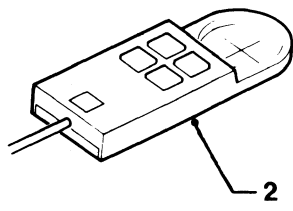
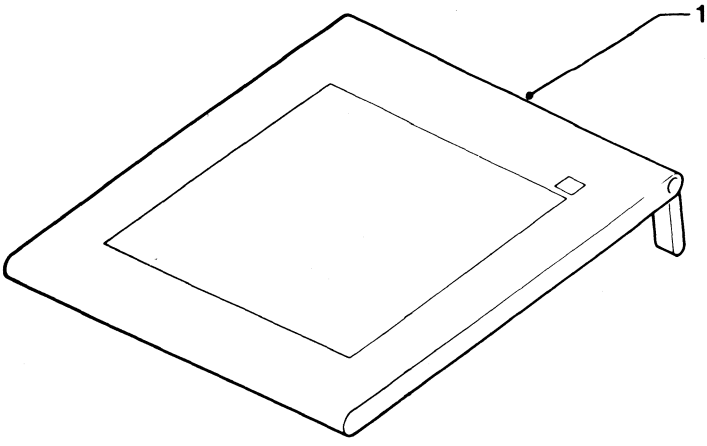
Figure 2A. Card Plugging Chart (Detail A)

FIGURE- INDEX NUMBER	PART NUMBER	UNITS PER ASM	1 2 3 4				DESCRIPTION
- 27	6952311	1					. CABLE MAINLINE POWER - NEW ZEALAND
- 27	6952311	1					. CABLE MAINLINE POWER - AUSTRALIA
- 28	4421584	1					. LOGIC CASING
- 29	4421599	1					. MOULDING INSERT (PWR SWITCH)
- 30	1887828	2					. FASTENER, PUSH-ON
- 31	8529253	1					. CABLE, 5371 ATTACH
- 32	4421640	1					. LABEL, HAZARD 800 V
- 32A	4421751	1					. LABEL, CARD POSITIONS
- 32B	4421756	1					. LABEL, CARD POSITIONS
- 33	4421593	1					. CARD COVER ASM
- 35	1623641	1					. SCREW, TAPTITE M4 FOR FIXING ITEM 5 TO ITEM 1
- 36	4420421	2					. SCREW, PLASTITE M4 FOR FIXING ITEM 4 TO ITEM 28
- 37	1621509	6					. SCREW, SKT HD M4 FOR FIXING ITEMS 6,7,8 AND 9
- 38	1624872	2					. SCREW, SL HD M4 FOR FIXING ITEM 20
- 39	1624874	2					. SCREW, SL HD M4 FOR FIXING ITEM 17
- 40	1623643	1					. SCREW, TAPTITE M4 X 12MM FOR FIXING ITEM 22 TO ITEM 1
- 41	4421595	1					. PANEL CONNECTOR
- 42	1622273	1					. WASHER, FOR ITEM 17
- 43	4421693	1					. WASHER, FOR ITEM 22
- 44	1621190	1					. SCREW, FOR ITEM 5
- 45	1622346	1					. LCK WSHR, FOR ITEM 5



| Figure 3. System Unit Asm

FIGURE- INDEX NUMBER	PART NUMBER	UNITS				DESCRIPTION
		PER ASM	1	2	3 4	
REFER TO IBM PERSONAL COMPUTER AT: HARDWARE MAINTENANCE AND SERVICE, FOR PART NUMBERS OF OTHER KEYBOARDS.						
4 -	6110344	1				KEYBOARD ASM - U.S. ENGLISH
	1445095	1				KEYBOARD ASM - U.K. ENGLISH
	1385096	1				KEYBOARD ASM - FRENCH
	1445097	1				KEYBOARD ASM - SPANISH
	1445098	1				KEYBOARD ASM - ITALIAN
	1445099	1				KEYBOARD ASM - GERMAN
	1351768	1				KEYBOARD ASM, APL U.S. ENGLISH
	1386543	1				KEYBOARD ASM - DANISH
	1386544	1				KEYBOARD ASM - SWEDISH/FINNISH
	1386545	1				KEYBOARD ASM - NORWEGIAN
	1386853	1				KEYBOARD ASM - SWISS/FRENCH
	1386854	1				KEYBOARD ASM - SWISS/GERMAN
- 1	8529170	1				. COVER ASM
- 2	8502468	1				. KEYBOARD CSA - U.S.
- 2	1445090	1				. KEYBOARD CSA - U.K. ENGLISH
- 2	1445091	1				. KEYBOARD CSA - FRENCH
- 2	1445092	1				. KEYBOARD CSA - SPANISH
- 2	1445093	1				. KEYBOARD CSA - ITALIAN
- 2	1445094	1				. KEYBOARD CSA - GERMAN
- 2	1386540	1				. KEYBOARD CSA - DANISH
- 2	1386541	1				. KEYBOARD CSA - SWEDISH/FINNISH
- 2	1386542	1				. KEYBOARD CSA - NORWEGIAN
- 2	1386851	1				. KEYBOARD CSA - SWISS/FRENCH
- 2	1386852	1				. KEYBOARD CSA - SWISS/GERMAN
- 3	8529168	1				. CABLE ASM
- 3A	1887915	1				. KEYBOARD ADAPTER CABLE (IBM 3270 PERSONAL COMPUTER KEYBOARDS ONLY)
- 4	8529169	1				. BASE ASM
- 5	1837469	1				. OVERLAY, KEYBOARD
- 5	6018060	1				. OVERLAY, KEYBOARD - U.K. ENG
- 5	6018061	1				. OVERLAY, KEYBOARD - FRENCH
- 5	6018064	1				. OVERLAY, KEYBOARD - SPANISH
- 5	6018063	1				. OVERLAY, KEYBOARD - ITALIAN
- 5	6018062	1				. OVERLAY, KEYBOARD - GERMAN OVERLAYS NOT SHOWN
- 6	1385585	1				. KEYBOARD APL KIT, KEY CAPS - U.K. ENGLISH
- 6	1385586	1				. KEYBOARD APL KIT, KEY CAPS - FRENCH
- 6	1385587	1				. KEYBOARD APL KIT, KEY CAPS - ITALIAN
- 6	1385588	1				. KEYBOARD APL KIT, KEY CAPS - SPANISH
- 6	1385589	1				. KEYBOARD APL KIT, KEY CAPS - GERMAN
- 6	1386746	1				. KEYBOARD APL KIT, KEY CAPS - U.S. ENG.



| Figure 5. Mod 2 Tablet, 4-Button Cursor, and Stylus Asm

FIGURE- INDEX NUMBER	PART NUMBER	UNITS PER ASM	1 2 3 4				DESCRIPTION
5 -	NO PN	1					5083 MOD 2 TABLET/4-BUTTON CURSOR/STYLUS ASM
- 1	6248433	1	.				TABLET
- 2	6248428	1	.				4-BUTTON CURSOR
- 3	6248427	1	.				STYLUS

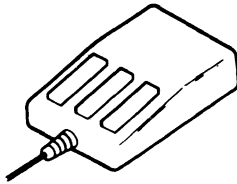
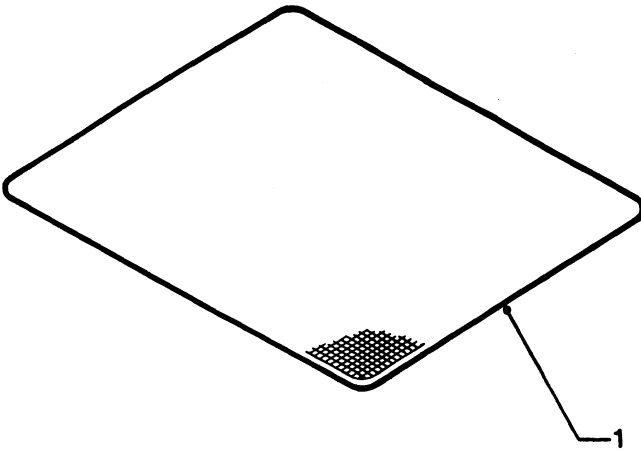


Figure 6. 5277 Mouse and Pad Asm

FIGURE- INDEX NUMBER	PART NUMBER	UNITS PER ASM					DESCRIPTION
			1	2	3	4	
6 -	1887686	1					5277 MOUSE AND PAD ASM
- 1	1887724	1					. PAD (SEE NOTE) SOME UNITS ARE REFERENCED 28-0148
- 1	1887687	1					. PAD (SEE NOTE) SOME UNITS ARE REFERENCED 28-0107

NOTE: WHEN ORDERING A NEW
PAD FIRST CHECK THE SERIAL
NUMBER OF THE MOUSE,
IF THE FIRST AND SECOND
DIGITS ARE '70' PAD 1887687
MUST BE ORDERED.
IF THE FIRST AND SECOND
DIGITS ARE NOT '70' PAD
1887724 MUST BE ORDERED.

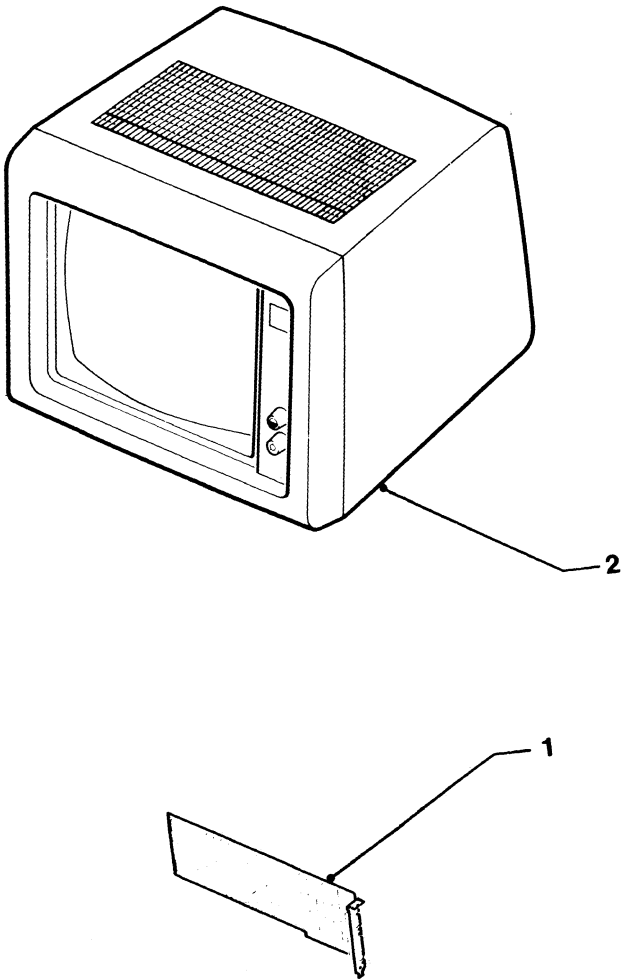


Figure 7. Dual Screen Feature (for use with 5378)

FIGURE- INDEX NUMBER	PART NUMBER	UNITS				DESCRIPTION
		PER ASM	1	2	3 4	
7 -	NO PN	1				DUAL SCREEN ASM
- 1	8529148	1				. MONO DISPLAY AND PRT ADPT
- 2	8529171	1				. DISPLAY MONO L.V. (110 V)
- 2	8130050	1				. DISPLAY MONO H.V. (220 V)

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NO PN	2 - 27	4421620	2 - 7
NO PN	3 - REF	4421621	1 - 4
NO PN	5 - REF	4421622	1 - 7
NO PN	7 - REF	4421623	1 - 6
1385585	4 - 6	4421624	1 - 3
1385586	4 - 6	4421625	1 - 9
1385587	4 - 6	4421626	1 - 5
1385588	4 - 6	4421627	1 - 22
1385589	4 - 6	4421628	1 - 10
1386540	4 - 2	4421629	1 - 15
1386541	4 - 2	4421629	1 - 15
1386542	4 - 2	4421630	1 - 16
1386746	4 - 6	4421631	1 - 12
1386851	4 - 2	4421632	1 - 13
1386852	4 - 2	4421634	1 - 17
1445090	4 - 2	4421635	2 - 3
1445091	4 - 2	4421636	1 - 17
1445092	4 - 2	4421637	2 - 3
1445093	4 - 2	4421638	2 - 3
1445094	4 - 2	4421640	2 - 32
1621190	2 - 44	4421641	1 - 18
1621509	2 - 37	4421642	1 - 18
1622273	2 - 42	4421649	2 - 21
1622346	2 - 45	4421680	1 - 19
1623641	2 - 35	4421691	2 - 17
1623643	2 - 40	4421693	2 - 43
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1887687	6 - 1	4421762	1 - 7
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Figure 8. Numerical Index



List of Abbreviations

ac	alternating current	EMA	Even Megabyte Aligned
addr	address	ESD	electrostatic discharge
APL	a programming language (and its character set)	FCC	federal communications commission
BATs	Basic Assurance Tests	FRU	field replaceable unit
BP	bit plane	GLP	general logic probe
coax	coaxial	GP	graphics processor
CRE	customer replaceable element	GPIB	general purpose interface bus
CRT	cathode ray tube	Hz	hertz
CTRL; Ctrl	control key	ID	identification
CVD	clock and video driver	in.	inch(es)
DAU	display attachment unit	I/O	input/output
DBR	display bus receiver	K byte(s)	kilobyte(s); (1K = 1024 bytes)
dc	direct current	KB	Kilo Byte(s); (1K = 1024 bytes)
DFC	distributed function communications	kg	kilogram(s)
DTMA	display/mouse/tablet adapter	lb	pound (weight)
EBCDIC	extended binary-coded decimal interchange code	LED	light-emitting diode
EHT	extra-high tension	MHz	megahertz
		mm	millimeter(s)

mono	monochrome	ROS	read-only storage
PC	personal computer	SC	system control
PDG	problem determination guide	SU	system unit
PICs	problem isolation charts	sync	synchronization
POR	power-on reset	T/C	timing and control
POST	power-on self-test	TP	test point
RAM	random access memory	UC	update control
ROM	read only memory	Vert	vertical
R,G,B	red, green, blue	V	volt(s)
		WA	write address
		W/O	without

FIGURE- INDEX NUMBER	PART NUMBER	UNITS PER ASM	UNITS				DESCRIPTION
			1	2	3	4	
3 -	NO PN	1					5373 SYSTEM UNIT ASM
- 2	8654378	1					. ADAPTER, DISTRIBUTED FUNCTION COMMUNICATIONS
- 3	8286115	1					. ADAPTER CARD, EMA EXTENDED MEMORY *
- 4	2683554	1					. ADAPTER, DISPLAY/MOUSE/TABLET
- 5	6347727	1					. CABLE INTERNAL, DISPLAY MOUSE/TABLET

* THIS IS A STANDARD 512K BYTE
MEMORY EXPANSION CARD WITH
REVISED SWITCH SETTINGS.

HELPFUL SYSTEM UNIT FRU PART NUMBERS (NOT INDICATED IN DIAGRAM)

8286168	1	64K RAM MODULE
8286139	1	128K RAM MODULE
8286121	1	BATTERY
8286122	1	POWER SUPPLY UNIT
8286129	1	FIXED DISK DRIVE DATA CABLE
8286125	1	FIXED DISK AND DISKETTE DRIVE ADAPTER
8286124	1	FIXED DISK AND DISKETTE DRIVE SIGNAL CABLE
8286127	1	80287 MATH COPROCESSOR
8286115	1	512K MEMORY EXPANSION ADAPTER
8286116	1	128K MEMORY EXPANSION ADAPTER
8529296	1	BINARY SYNCHRONOUS COMMUNICATIONS (BSC) ADAPTER
8529148	1	MONOCHROME DISPLAY AND PRINTER ADAPTER
8286147	1	SERIAL/PARALLEL ADAPTER
8286170	1	SERIAL ADAPTER CABLE
8286130	1	HIGH CAPACITY DISKETTE DRIVE
8286131	1	DOUBLE SIDED DISKETTE DRIVE
8286128	1	FIXED DISK DRIVE

NOTE: FOR IBM PERSONAL
COMPUTER - AT 5170
SYSTEM UNIT FRU PART
NUMBERS, REFER TO; IBM
PERSONAL COMPUTER - AT
HARDWARE MAINTENANCE
AND SERVICE.

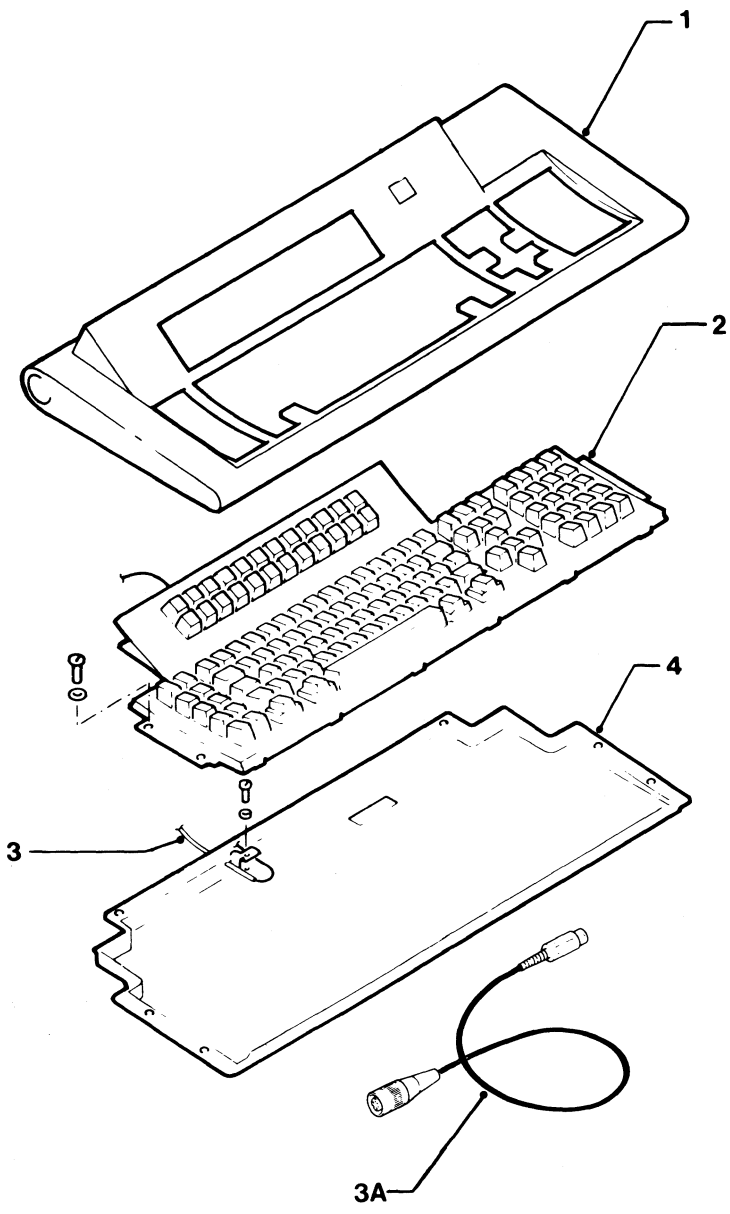


Figure 4. 3270 Personal Computer Keyboard Asm

Glossary of Terms

This glossary explains terms and abbreviations used in the manual. The glossary contains terms and definitions from the *IBM Vocabulary for Data Processing, Telecommunications, and Office Systems*, GC20-1699; that book includes entries (preceded here by an asterisk) from the *American National Dictionary for Information Processing*. Review the index or to the *IBM Vocabulary* if you do not find here the term that you are looking for.

adapter card. A hardware part, added to the system unit that expands basic function.

advanced diagnostic diskette. A diskette used by service representatives as an aid to problem determination.

asynchronous communications adapter. An adapter in the system unit to which non-IBM devices can be connected. The adapter provides an EIA RS-232-C interface for such devices.

back up. When using diskettes, to duplicate data or a program from a fixed disk or a diskette to another diskette so that the material is available if its original is lost or damaged. (Note that this term is not the same as the DOS fixed-disk command BACKUP, described in the *IBM Personal Computer Disk Operating System* manual.)

barrel distortion. A condition in which the sides of a displayed

image are bowed out at their centers. (Contrast with **pincushion distortion**.)

bezel. The front panel that surrounds the display screen.

blinking. A means of highlighting the cursor or some part of the displayed information (such as a character) by alternately displaying and suppressing it.

border. The boundary around the image area of the screen.

coax; coaxial cable. A cable consisting of one conductor, usually a small copper tube or wire, that is inside of and insulated from another conductor of larger diameter, usually a copper tube or copper braid.

color convergence procedure. The method of "sharpening" the edges of colored, displayed information. The procedure permits accurate aligning of the primary colors (red, green, and blue) that produce other colors on the screen.

combination keys. Keys that must be used at the same time with other keys to produce the desired function. Combination keys include Control (Ctrl), Shift, and Alternate (Alt), used in a personal computer session, and Shift and Alt, used in a host session.

configuration. The arrangement of devices and programs that make up a system, subsystem, or network.

control keys. A general term for the keys used in work other than that of entering data. They include the Control (Ctrl) key and the Work Station Control (WS Ctrl) key.

converged, convergence. The condition in which the red, blue, and green electron beams together produce a white display with no colored edges.

cross-hair. A cursor consisting of two short lines that cross each other's center at an angle of 90 degrees.

cursor. A movable mark on the screen, usually indicating where the next character is to be entered, changed, or deleted. (See **cross-hair** and **four-button cursor**.)

cursor-movement keys. The arrow keys that can move the screen cursor. The black cursor-movement keys, in the right-hand control-keys area, are used for host computer applications and for work station control mode; the blue cursor-movement keys in the numeric keypad are used for personal computer applications. (See also **mouse**.)

customer replaceable element (CRE). A part of the work station that can be removed or installed by the customer (for example, the keyboard assembly). (Contrast with **WSRE**.)

customized. An arrangement of the hardware and microcode to meet the requirements of a

specific customer application. Usually performed by the customer using a step-by-step process defined by IBM.

data set. see file.

DAU. Display attachment unit.

degauss coil. A coil attached to a cathode ray tube for removing abnormal magnetization that may distort the color convergence.

degauss switch. A switch on the side of the IBM 5379 Display that is pressed to make stable the picture colors after the display unit has been moved.

***diagnostic.** Pertaining to the detection and isolation of a failure or mistake.

diagnostics diskette. A diskette used by work station users to find the reasons for hardware problems. Contrast with *advanced diagnostics diskette*

diskette. A flexible magnetic disk, permanently enclosed in a protective cover and used for storing data. (Contrast with **fixed disk**.)

diskette drive. A device that stores information in, and gets information from, removable diskettes. (Contrast with **fixed-disk drive**.)

display. (1) The screen image. (2) A device, such as the IBM 5379 Display, and the IBM 5151 Monochrome Display, for visually showing information.

display attachment unit (DAU). An element of the work station that provides the alphanumeric functions, graphic functions, and buffer storage

needed for operation of the all-points-addressable display. For an IBM 5379 Display, the element is an IBM 5378 Display Attachment Unit.

display/mouse/tablet adapter. The adapter in the system unit to which the DAU, mouse and tablet can be connected.

distributed function communications adapter.
Same as 3278/79 Emulation adapter.

dump. A copy, on diskette, of all the information that is in your work station memory. You take a dump to aid in problem determination.

EBCDIC. Extended binary-coded decimal interchange code.

EIA RS-232-C adapter. Same as asynchronous communications adapter.

erase. To remove from storage a keystroke recording that you no longer need. This is not the same as the DOS command ERASE, described in the *IBM Personal Computer Disk Operating System* manual.

extended binary-coded decimal interchange code (EBCDIC). A coded character set consisting of 8-bit coded characters.

feature bus. The logical data path along which the base machine communicates with added features.

field replaceable unit (FRU). An assembly that is completely replaced by another one when any of its components fails. A FRU may contain other FRUs. A FRU

must be only removed or installed by trained personnel. (See also *customer replaceable element* and *work station replaceable element*)

file. A collection of data. This data can be programs, text, statistics, pictures, or charts. Files are stored in the host computer, on personal computer diskettes, or on the personal computer fixed disk. (Also known as **data set**.)

fixed disk. A nonremovable storage that may be provided in a work station. The disk is made of rigid material with a magnetic coating. If present, the disk is contained in a drive in the system unit and is used for the storing of large amounts of data. (Contrast with **diskette**.)

fixed disk drive. A device that may be in the system unit that stores information in, and gets information from, a nonremovable disk. (Contrast with **diskette drive**.)

flashover. An internal discharge inside the CRT.

formatting. Preparing a diskette or fixed disk so that it can be used by the Disk Operating System and can accept DOS files.

four-button cursor. A hand-held device, with cross-hair sight, for indicating positions on the surface of a tablet. (See also **stylus**.)

FRU. Field replaceable unit.

garbage. A random display of characters that is not usable and has no meaning; it may indicate that there is an existing problem.

general purpose interface bus adapter (GPIB). The adapter on the system unit to which IBM 7371, 7372, 7374, or 7375 Color Plotters can be connected. You can attach up to 13 devices (IBM or non-IBM) to the adapter.

hang; hanging. See **hung up**.

highlighting. An effective visual indication of some of the displayed information by, for example, blinking, changing color to white, reverse video, or underscoring.

hung up. The system is in a "stop condition," and has not completed a set task. This may be caused by a failure but no error code is displayed. The condition may clear if the work station is powered-off then powered-on again in the correct sequence.

IEEE-488 adapter. See general purpose interface bus adapter.

interlace. 1. Screen scan is by alternate lines. 2. Sequential scanning of alternate lines of the screen. 3. Use of two sequential interleaved fields to produce one frame or picture, to reduce flicker.

jitter. A random, repetitive movement of an image on the screen occurring at varied intervals.

kilobyte. 1024 bytes; 1K bytes.

load (verb). To transfer a copy of information or of a program from a diskette to the work station.

lug. A locking, attachment point or plate.

megabyte. 1 048 576 bytes; 1M bytes.

memory expansion (adapter) card. A hardware part, added to the system unit, that does not adapt but only extends the memory function of the unit.

menu. A list of available operations, in a menu panel, from which you select the operation you want.

misconvergence. Opposite in meaning to "convergence" (see above).

monochrome. Single color.

monochrome display. The IBM 5151 Monochrome Display Model 2, an optional device for attaching to the IBM Personal Computer AT/GX.

monochrome display and printer adapter. The adapter on the system unit of an IBM Personal Computer AT/GX to which a monochrome display can be attached. (Contrast with **printer adapter** and with **printer/memory adapter**.)

mouse. (1) A hand-held device (the IBM 5277 Mouse) that you move around on its pad to locate the graphics cursor on the screen. (2) A device that is moved around a surface to send location information to the Graphics Control Program.

numeric keypad. The rightmost area of the keyboard. It is used in an active personal computer session as a number pad or for cursor movement. The Numeric Lock (NumLk) key toggles between cursor keys and number pad.

pad. The surface, marked with a grid of light-sensitive lines, on which the mouse moves. (See also **numeric keypad.**)

pattern. A symbol that is repeated to fill an area.

PC AT/GX. The IBM Personal Computer AT/GX work station.

PC AT system adapter. The adapter on the system unit to which the coaxial device cable to the host system is connected. (Also known as **distributed function communications adapter.**)

peg. A pin or stud that protrudes to give support.

pel. Picture element.

PF (F)key. Program function key.

pincushion distortion. A condition in which the sides of a display image are bowed inward at their centers. (Contrast with **barrel distortion.**)

*** plotter.** (ISO) An output unit that prints data in the form of a two-dimensional graphic representation.

power-on reset (POR). A signal, occurring during powering on, that resets all circuits to an operational starting condition.

program function (F) key. A key that passes a signal to a program calling for a particular operation. The F keys are located in the topmost area of the keyboard. The IBM Personal Computer function keys are part of the F keys.

puck. Deprecated term for **four-button cursor.**

raster. The pattern of lines on the display screen that is created by the scanning electron beam. The raster may be visible when the brightness is increased.

repeat-action key. A key that, when held down, causes an action (such as keying of a character) to be repeated until the key is released, for example, a typematic key.

RS-232-C. See **asynchronous communications adapter.**

scratch diskette. A new diskette or one containing data that is not wanted and which may be written over.

stand-offs. Insulated supports or spacers.

stylus. A pen-like pointer for indicating positions on the surface of a tablet. (See also **four-button cursor.**)

swivel. A mechanism that permits horizontal rotation.

system unit. (1) The device that communicates between the display and the keyboard, and between the work station and the host system. The system unit does processing and control operations for the work station.
(2) The IBM PC-AT System Unit, an element of the work station. The system unit contains a diskette drive (and, optionally, a second diskette drive or a fixed-disk drive) and contains adapters for optional devices.

tablet. The IBM 5083 Tablet Model 2, an optional input device for the work station. The tablet, with a four-button cursor or a stylus, enables you to address positions on the screen and to move the graphics cursor without using the keyboard. (See also **four-button cursor** and **stylus**.)

twin-ax. Co-axial-type cable with two inner conductors.

typematic. Pertaining to key functions that are repeated when the key is held down. (See also **repeat-action key**.)

3274-attached printer. The printer that is attached to the host computer by an IBM 3274 Control Unit. The printer serves a number of users.



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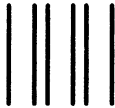
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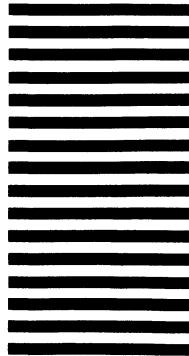
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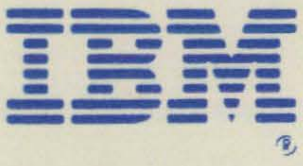
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