



Hardware Maintenance Service

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Federal Communications Commission Radio Frequency Interference Statement

Warning: The equipment described herein has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of the FCC rules. Only peripherals (computer input/output devices, terminals printers, etc.) certified to comply with the Class B limits may be attached to the computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception. If peripherals not offered by IBM are used with the equipment, it is suggested to use shielded grounded cables with in-line filters if necessary.

CAUTION

The products described herein are equipped with a grounded plug for the user's safety. It is to be used in conjunction with a properly grounded receptacle to avoid electrical shock.

Safety Inspection Guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards not covered by this inspection guide.

If any unsafe conditions are present, a determination must be made on how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power: primary voltage on the frame can cause serious or fatal electrical shock.
- Explosive hazards, a damaged CRT face or bulging capacitor can cause serious injury.

- Mechanical hazards, loose or missing hardware can cause serious injury.

This safety inspection guide consists of a series of steps presented in a checklist. Begin the checks with the power off and the power cord removed from the electrical outlet.

We recommend all non-IBM devices and attachments be removed from the unit before you conduct the safety inspection.

Reference Literature:

- *Guide to Operations* manual.
 - Any applicable safety publications.
1. Check exterior covers for damage (loose, broken, or sharp edges).
 2. Power off the system. Disconnect the power cord from the electrical outlet.
 3. Check the power cord for the following:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
 - b. The cord set should be the appropriate molded type as specified in the parts catalog of this manual.
 - c. Insulation must not be frayed or worn.
 4. Remove the back panel from the system unit (if applicable).
 5. Remove the cover mounting screws, and remove the cover.
 6. Check for any obvious non-IBM alterations. Use good judgement as to the safety of any non-IBM alterations.
 7. Check inside the unit for any obvious unsafe conditions, such as: metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
 8. Check for worn, frayed, or pinched cables. Ensure the voltage specified on the voltage tag, or switch position (back

panel of the machine) matches the voltage of the power receptacle. If in doubt, verify the voltage at the power receptacle.

9. Examine the power supply and verify the following:

- a. Nonremovable fasteners in the power-supply cover have not been removed or tampered with.
- b. The grommet is installed where the internal power cables come through the frame of the power supply.

10. Check for the following labels on all systems:

- "Caution: Hazardous Area. Do Not Remove This Cover. Trained Service People Only. No Serviceable Components Inside"

or



- Hazardous voltage inside. Do not open.

11. In systems using a battery, check for the following labels:

- "BATTERY WARNING: Do not dispose of battery unit in fire or water. See instruction for disposal in the battery installation instructions."

or



- Replace only with P/N XXXXXXXX. Use of a different battery could result in ignition or explosion of battery. Order replacement from IBM authorized dealer.

12. Visually check the condition of the battery (if applicable) and ensure the battery has a safety hazard label attached.

13. Machines manufactured May 1986 or later, weighing in excess of 18 Kg. (41.8 lbs), must be labeled with the weight of the system unit.

How to Use this Maintenance Library

This Hardware Maintenance library consists of three major diagnostic tools; a two-part set of diagnostic manuals and Advanced Diagnostics diskettes.

The *Hardware Maintenance Reference* manual describes diagnostic procedures and their use, field replaceable unit (FRU) removal and replacement procedures, and provides general information about the systems. Once the reader has become familiar with its content, the *Hardware Maintenance Reference* manual is no longer required on each service call. It can be kept in a convenient place and used as needed.

The *Hardware Maintenance Service* manual contains all necessary information to diagnose a failing system. Maintenance analysis procedures (MAPs), jumper positions, switch settings, and the parts catalog are in this manual.

Additional options may require updates to the manuals. The *Hardware Maintenance Reference* manual provides an area in the back of the manual to file the updates. Each section of the *Hardware Maintenance Service* manual (with the exception of the MAPs) has a designated update area. The MAPs are sequenced by number and can be updated accordingly.

The Advanced Diagnostics diskette is designed to be used with the MAPs to:

- Test each area of the system
- Isolate problems to specific areas of the system through the use of error codes
- Verify correct installation and operation of the system.

Other functions of the Advanced Diagnostics diskette are described in the *Hardware Maintenance Reference* manual.

Preface

This manual provides the information needed to diagnose and repair IBM Personal Computer products. Readers should have received training on IBM Personal Computer products and be familiar with the Triplet Model 310 Multimeter¹ or equivalent.

The manual is divided into two major categories; system specific information and Personal Computer family diagnostic MAPs.

The system specific information is identified by the system name and organized as follows:

"START" is the entry point for all diagnostic procedures.

"JUMPERS AND SWITCH SETTINGS" contains jumper positions and switch settings for the system unit and supported options.

"PARTS CATALOG" contains illustrations and part numbers of field replaceable units (FRUs).

Step-by-step instructions to isolate failing FRUs are located in the **"DIAGNOSTIC MAPs"** section.

Related repair information can be found in the *Hardware Maintenance Reference* manual. Operating instructions are in the *Guide to Operations* manual. Detailed hardware and interface information is in the *Technical Reference* manual.

The term "Reference manual" as used in this manual, refers to the *Hardware Maintenance Reference* manual.

¹ Manufactured by the Triplet Corporation, Bluffton, Ohio 45817

Notes:

